November 23, 1929 A McGraw-Hill Publication 20 Cents per Copy

AVIATION

The Oldest American Aeronautical Magazine

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IN TWO SECTIONS

Section One

THREE YEARS OF *Progress*

An Interview with Harry F. Guggenheim

Standardizing SMALL ENGINE PARTS

Soundproofing AIRPLANE CABINS

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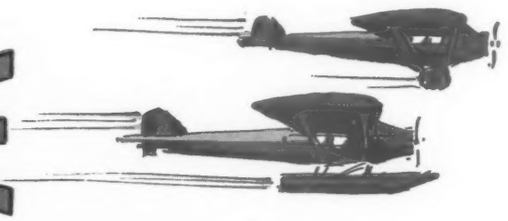

BOHNALITE

62% LIGHTER THAN IRON

AVIATION. November 23, 1929. Vol. No. 27, No. 21. Published weekly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at 36th Street, New York, N. Y. Domestic $4.00 per year, Canada $5.00. All other countries $6.00; 20 cents a copy. Entered as second-class matter July 27, 1928, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

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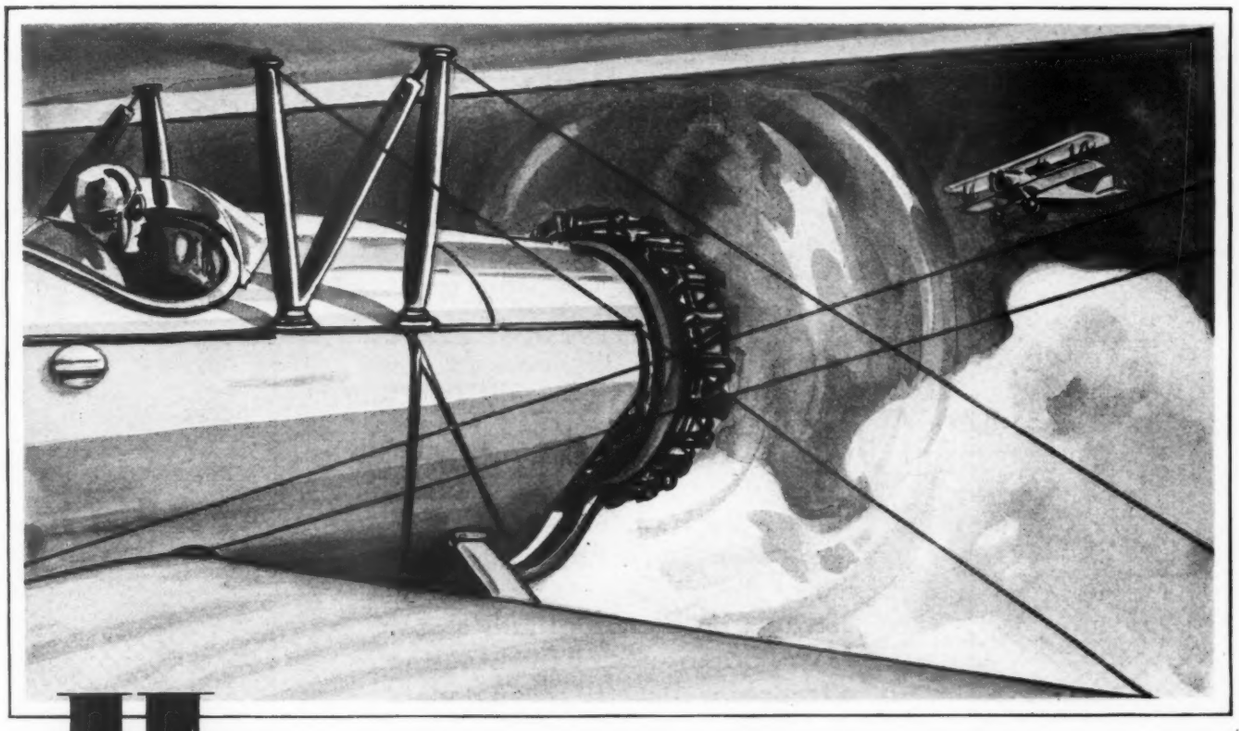

How visible is your plane?

Can you be seen a mile away or are you just "another ship gone up"? Does your plane taxi across the field looking like a dusty sparrow or does it sing up to the line like a tropical bird spreading its wings for flight?

No matter what plane you fly, instant visibility is a great safety factor. You've got to be seen to be avoided.

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Write for new handbook

Airplane Finishing Specifications, recently prepared by Sherwin-Williams Colorists gives full information on methods of application, color combinations and contrasts in fast-to-light colors.

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Cleveland, Ohio

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Cleveland, Ohio.
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Please send me your Airplane Finishing Specifications Book.
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Business Title .....
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City ..... State .....

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For Planes, Hangars and Equipment

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The new Goodyear Airwheel is available only in a limited way at the present time. For information or engineering assistance in equipping your future ships, write Aeronautics Department, Goodyear, Akron, Ohio or Los Angeles, California.

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Flying through at cruising speed—suddenly meeting vicious headwinds—that's when pilots most appreciate the reserve power built into Axelson aircraft engines—a push on the throttle and the engine responds with power that maintains normal ground speeds even against strong, adverse headwinds.

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The Safety Seat is a Life Saving fact—not a dream.

It is the only actual and practical life saving device for Transport Planes in the world . . . It is essential to Safety in Air Travel.

It is a well upholstered comfortable chair showing no sign of its purpose . . . But when danger threatens, with one turn of the control, the upholstery springs around the passenger—just two simple movements without moving from the chair—another turn of the control, and through the bottom of the plane the passenger floats safely to earth . . . Every movement automatic and positive, not a chance of failure. 20 passengers can be safely released from a plane in 20 seconds. Write for free booklet, "Coming Down," giving vivid story of Safety Seat and Chutes.

Miss Marie Smullen after landing from a Safety Seat drop made on her first flight at Mercer Airport.

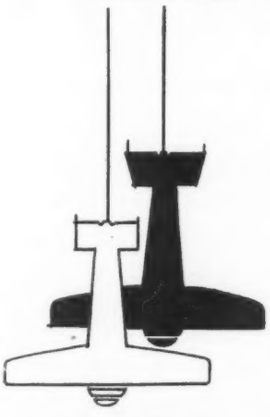
SWITLIK MANUFACTURING CO.

TRENTON **NEW JERSEY**

A lighter, stronger safety glass

The Mono Airplane Co. uses Armor-Lite exclusively. This selection was due to the fact that Armor-Lite "Featherweight" is a lighter, stronger glass particularly suited for aircrafts, and is easier to cut and install.

The Monocoach shown here recently completed a tour of the United States advertising the Elk's Convention at Los Angeles.



At every large airport, you will find the more modern planes equipped with Armor-Lite scatter-proof glass.

Armor-Lite is an improved safety glass that provides increased protection and visibility with decreased weight.

5 Ply Armor-Lite weighs five to ten ounces per square foot less than 3 ply sheet drawn or polished plate . . . Featherweight Armor-Lite weighs only twenty-four ounces to the square foot.

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No safety glass made excels Armor-Lite in quality, visibility or strength. . . Write for our booklet . . . Address

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THE KITTYHAWK

First and foremost built for safe flying

To gain superiority in either speed or performance a plane must sacrifice safe flying qualities. The Kittyhawk has not attempted to develop those features at the expense of its general all-round characteristics for safe flying . . . it will travel at 110 miles per hour . . . it will out-perform most planes in its class . . . but first and foremost the Kittyhawk is built for safe flying.

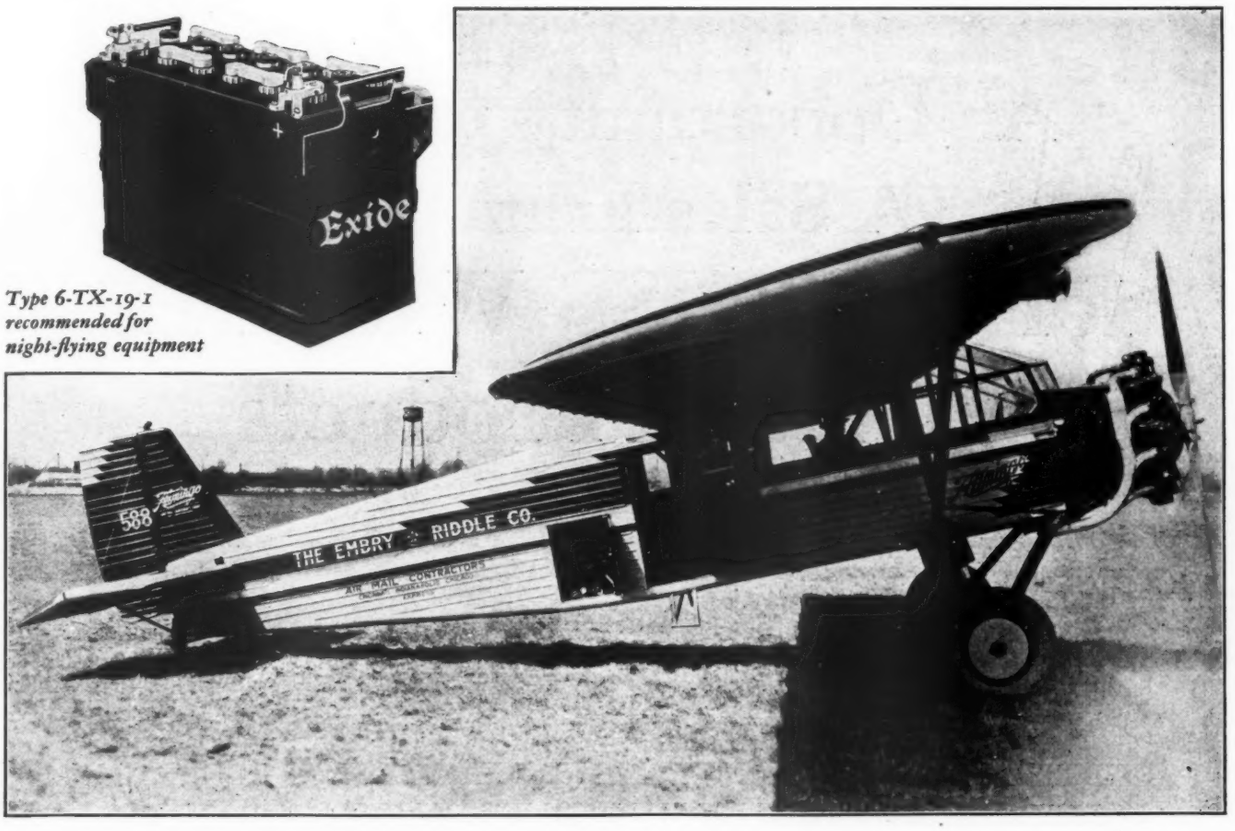
With a landing speed of 38 miles per hour . . . with a wheel tread of seven feet two inches . . . the Kittyhawk is particularly adept at getting in and out of small rough fields . . . a factor which enables even the inexperienced pilot to land under unfavorable conditions . . . with a greater degree of safety.

SPECIFICATIONS
Kittyhawk Model B-4

Engine—Kinner K-5 100 H.P. Approved Type Certificate No. 166	
Length overall	22 ft. 11 in.
Height overall	8 ft. 8 in.
Span both wings	28 ft.
Chord both wings	4 ft.
Wing area	233.4 sq. ft.
Weight empty	1107 lbs.
Useful load	768 lbs.
High speed	110 m. p. h.
Cruising Speed	90 m. p. h.
Landing speed	38 m. p. h.
Climb	1200 ft. p. m.

THE VIKING FLYING BOAT COMPANY
89 Shelton Avenue, New Haven, Conn.
Miami Hangar — The Viking Flying Boat Company (Florida) Inc.

Type 6-TX-19-1 recommended for night-flying equipment



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The market for Curtiss-Wright products is firmly established, with annual sales amounting to many millions of dollars. Curtiss-Wright service organizations cover the country and will be a bulwark of strength to the local sales organizations. An advertising program of greatly increased scope and other means of effective promotion now under way, will insure continued progress in Curtiss-Wright sales during the coming year.

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The Most IMPORTANT MESSAGE OF THE YEAR

Beginning January 1, 1930, the Cessna Aircraft Company will no longer be affiliated in any way with any sales corporation within the industry. On that date, with a new sales policy, a new sales organization and with new models, the Cessna Company sets forth to gain its rightful place as a leader in the aeronautical world.

At no other time in its entire history has the Cessna Aircraft Company faced such a promising future. Financially sound, led by men with wide experience in every phase of the aeronautical industry, the new organization has every reason to be confident of success.

As for the planes themselves . . . . In stability, strength, speed, fuel economy, ease of handling—in all of the requirements modern aircraft must meet—the new Monoplanes Cessna, each with an Approved Type Certificate, are excelled by none in their class. They have a definite, permanent place in the aeronautical world; they are built to meet a rapidly growing demand for planes of their type throughout the field of aviation. We prophesy that the new Monoplanes Cessna will find instant acceptance wherever their performance is noted.

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Territories are being filled rapidly, due to the exceptional value of the Cessna Sales Franchise. Reliable business men are requested to write immediately for complete information.

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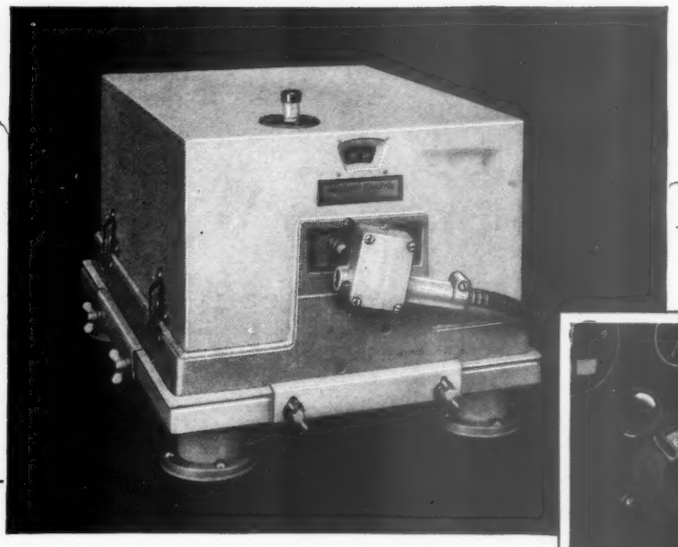
WICHITA ✣ U. S. A.

The tri-motored plane of the Bell Telephone Laboratories.



Western Electric radio telephone receiver and associated remote tuning control.

"Fly the beacons"... with a Radio Telephone Receiver!

DAY and night, clear or cloudy, whether you fly for sport or on a regular transport run, you can now "fly the beacons" and be kept on your true course by using a Western Electric Radio Telephone Receiver.

This Radio Telephone Receiver — developed exclusively for plane installation — also enables the pilot to obtain weather forecasts sent out at regular intervals by Department of Commerce Weather Stations. It is an important factor in the safe and efficient operation of aircraft. Western Electric Aviation Communication Systems—made by the makers of the nation's telephones — have been developed and tested under all flying conditions in the planes of the Bell Telephone Laboratories. They have proven thoroughly dependable!

For bulletin containing full information, address Western Electric Company, Department 242A, 195 Broadway, New York, N. Y.

Facts about the radio telephone receiver

Western Electric's radio telephone receiving set for planes is ruggedly built, compact (9 7/8" x 12 3/8" x 6") and light (only 17 pounds). Its parts are readily accessible and the entire set may be removed for inspection by loosening four wing nuts. Designed for remote control, the receiver may be installed in any part of the plane — while the small and easily operated tuning control is mounted on the instrument panel. Power may be supplied by either a dynamotor or wind driven generator.

Western Electric

Aviation Communication Systems

MADE BY THE MAKERS OF YOUR TELEPHONE

This WACO, with John Livingston at the controls, had a perfect score for every lap. It brought to WACO the distinction of having won, by a commanding lead, two successive National Air Tours. More than that, WACO placed "one-two" this year, with Arthur J. Davis piloting the second WACO entry.

The Ship that Won

THE ship that won the Fifth National Air Tour was a stock 3-place, open cockpit WACO "225" Straight-wing. So was the second-place ship. Both were taken from the assembly line and given the customary factory flight tests. Only a scant half-hour in the air preceded their entry in the Tour.

These WACOS were powered by the Wright J-6, 7-cylinder motor. Standard equipment included Eclipse Hand Inertia Starter, navigation lights, tachometer, altimeter, oil temperature and pressure gauges and air speed indicator. The only special equipment consisted of an Aperiodic compass, a bank-and-turn indicator, and fairing on the lower-wing butts.

In official tests at Detroit preceding the Tour this $7,335 WACO was awarded the highest figure of merit among competing makes of all types and prices. Its landing time was exactly 3 4/10 seconds—less than 100 ft.! Its take-off also was quicker than that of any other entry . . . . 4 4/10 seconds . . . . with full Dept. of Commerce A.T.C. loading, 2600 lbs. Its average top speed was 135.44 m.p.h. four times over a measured course. Just 85% of this speed, or 115.12 m.p.h. would rate a perfect score. Actually, WACO averaged 129.97 miles per hour for the 5,017 miles of the Tour.

That, you must admit, is performance! *Spectacular* performance in the formula tests. And *consistent* performnce in 32 laps of scheduled flying. On the strength of it, the winning WACO scored a total of 45,672 points . . . a margin of 7,178 points over the next competing make.

Take these figures as significant proof that the WACO "225" Straight-Wing is *the practical* ship for you to own and to fly. The nearest WACO dealer will arrange a flight demonstration at your convenience. And, if you wish, we'll send you one or both of our interesting booklets giving full details about the winning WACO and the Tour.

THE WACO AIRCRAFT COMPANY, TROY, OHIO

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"ASK ANY PILOT"

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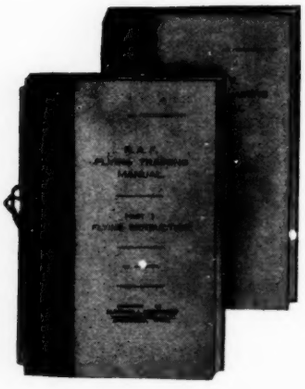

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$15.00

AVIATION

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Are Selected Because of Their

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SIMPLICITY
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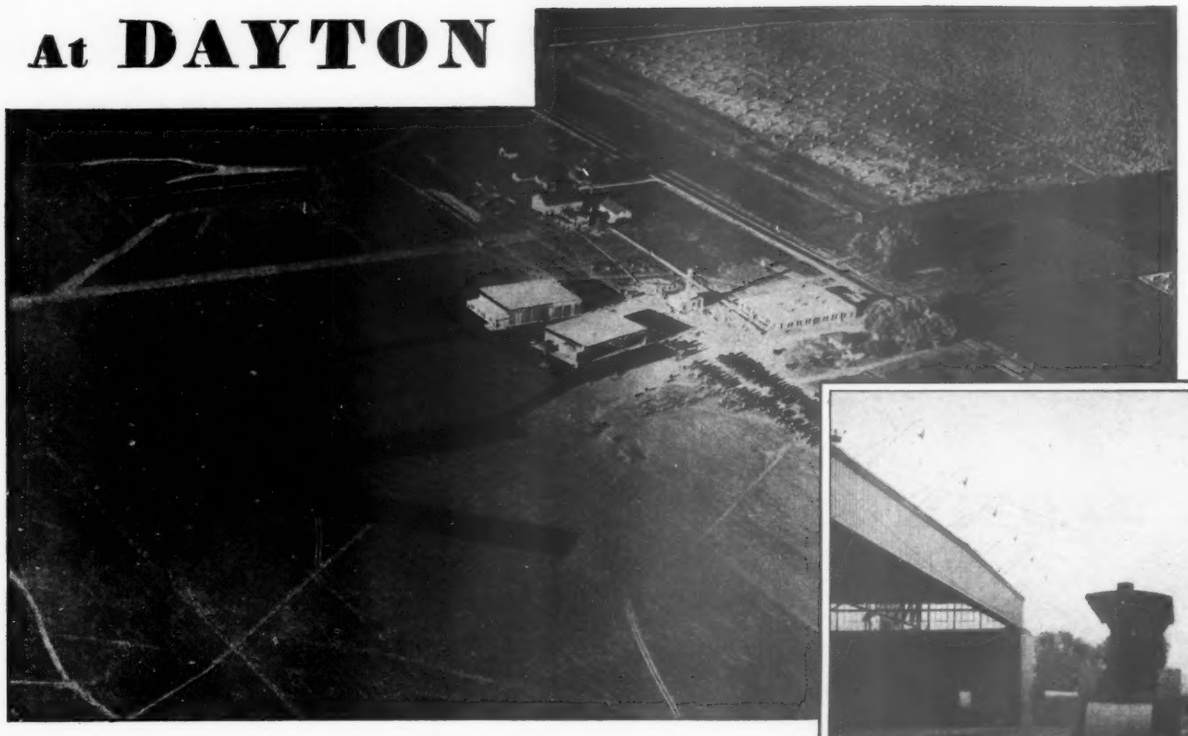

NO effort has been spared to make the Dayton Airport (upper left) one of the most modern and complete airports in the country. The photo above shows the Tarvia apron facing one of the Dayton hangars.

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

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Where Do We Sell Next?

WHEN Doctor Eckener was in the United States last summer, at the conclusion of his world-encircling flight, he was called upon to respond at a luncheon in his honor in Cleveland. "We have heard," remarked the Doctor in opening, "many kind words about our flight. I have been called a great hero," he said in substance, "and I have also been told that I am a pioneer of commercial airship transportation. Either one might perhaps be true, but both could not. If it takes a hero to fly in an airship there could be no commercial operation, for the supply of heroes is too limited."

Those who are engaged in selling airplanes to the public for personal use will do well to bear that sapient observation in mind. It has a great bearing upon the orientation of their efforts.

An exponent of the precarious business of flying at county fairs complained, some eighteen years ago, that flying was becoming commonplace and that the edge was wearing off the game. He knew it because the chambermaids at the hotels where he put up had stopped stealing his pajamas for souvenirs. Not until the coming of Lindbergh was public interest again expressed in that precise fashion. It was a good sign for the future of aviation as a business when the crowd ceased to view the pilots as supermen, residing upon earth for a brief period for the sole purpose of making the hearts of mere mortals rise into their throats. They have come to recognize them as ordinary human beings who eat three meals a day and play golf and poker and smoke the same brand of cigarettes that they do themselves, but they still think of them and of the airplane owners as belonging to a group set aside by a common and somewhat abnormal interest. The dispelling of that impression from the public mind is the next hurdle that we have to clear in promoting the airplane and its use.

There is a substantial and a steadily growing number of private owners of aircraft in the United States, but as yet they have been drawn almost entirely from among the aviation enthusiasts—the people who buy an airplane largely, if not solely, because they want to fly. There are not enough in that class to permit of real mass production. The task upon which sales departments have now to focus their attention is the selling of planes to individuals or groups of corporation officials who are perfectly indifferent to flying as such, but who do want a service which only the airplane can give.

Compare the automobile. For once the analogy between the two industries is almost perfect. The first highway vehicles were sold, and sold in very small numbers, to mechanical enthusiasts who liked to tinker with their machinery; to those professionally interested in transportation who wanted to see for themselves what the novelty amounted to; and to people who had, either by intention or in spite of themselves, become indirectly involved in the promotion of the new industry. Mass production and mass selling became possibilities only when the idea of using motor cars had been accepted by a great number of individuals who had no desire ever to get their hands dirty on the mechanism and who cared only about the results obtained, not at all about the mechanical means adopted in securing them. To bring them into the field various things were necessary, especially an energetic selling campaign and the development of a network of repair shops and highway service organizations that made motoring trouble-free by enabling the motorist to pass his troubles on to someone else. Automobile owners ceased to be a group set aside in the community not simply because their numbers had increased, but because they no longer had an absorbing common interest and a common specialized vocabulary.

The airplane will take a substantial time to pass

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through the corresponding transition, and in the meantime the enthusiasts are the backlog of the market, a support that must be held firm and cultivated to the limit. It is the example of intelligent use of the airplane which they, or many of them, are setting that will lead others to follow in their footsteps. For the great future, a market must be developed among purchasers who care nothing about governmental air force policy, except as any intelligent taxpayer may, and less than nothing about the selection of airfoils or the refinements of structural analysis.

It is not upon thrill or upon romantic appeal that they are to be sold, but solely upon the saving of time and trouble in going from here to there.

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Canada Strikes Out on Her Own

ALMOST simultaneously with the formal acceptance of an agreement to simplify flying across our northern border and to reduce governmental interference with aerial operations there to an indispensible minimum, there comes a report of the formation of a Canadian Aeronautical Chamber of Commerce under a different name. The Canadian Association of Aeronautical Interests, like the Chamber of Commerce here, represents a conviction that the aircraft industry has become too complex, and its collective interests too large, to be left to the whims of chance or to an occasional and casual cooperation by agreement between individual firms.

It is natural that our neighbors in the Dominion should create their own industrial organs, especially for better collective dealing with their own government. Their industrial problems and their methods of operation have differed in many respects from those corresponding in the United States, and in developing novel practical employments for aircraft Canadian operators, under the lead of the Department of National Defense and particularly of Mr. J. A. Wilson and his staff, have been among the world's leaders. The attitude toward industry in Ottawa is sharply different from that displayed in Washington, as the systems of government themselves are different.

Nevertheless, the compelling force of geography and of a century of history of peaceful and mutually profitable association will not be denied. Industry transcends politics. Without the need or wish for political association or alliance, the people of the United States and those of Canada have been irresistably drawn together. Ties of blood, of personal friendships innumerable, and of business relation have reinforced the natural results of contact along an open and non-"strategic" border three thousand miles long.

Canadian and American industry are largely under common guidance, representing an enlistment and a co-operation of the best talents of both nations. No advance can be made on either side of the border without its favorable effects being promptly felt on the other. Nowhere else in the world will two sovereign states be found so closely bound together. Nowhere else, despite the differences in our laws and despite tariffs, can international flying be carried on with so little fuss. Mr. Wilson and Secretaries MacCracken and Young have started out with a willingness to recognize each other's problems and a determination to agree, and they have done so.

There could be nothing gained by a narrow separatism. We shall both travel farther and faster if, without sacrificing our independence, we travel together. The Canadian Association and the Aeronautical Chamber of Commerce ought to work hand in glove with each other. There is a common interest which we of AVIATION are glad to recognize and to defend. Some months ago we ceased to treat Canadian news as "foreign" and began to handle it on a common basis with that of activities in the United States. We call upon our readers in the Dominion, of whom we are proud to have many, as well as upon readers and industrial organizations below the border, to work for not only a continuation but an extension of that co-operation that has already borne such good fruit in aeronautics and in other industries. So we shall best extend the manufacture and use of aircraft upon the North American continent.

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Unmaking Air-Mindedness

THE AMERICAN PEOPLE have started with a strong predisposition in favor of aviation. Even those who make no direct use of the airplane and entertain no plans for doing so are eager that air transport should progress. Where the friendly air has chilled, and where hostility to the airplane and all its works has taken its place, some definite reason has existed. Wherever there is opposition to the opening of airports, such as has unfortunately shown itself in several communities, or to continued free operation from fields already in service, there is cause for us to search our own souls. We may create hostility through our own demeanor. We may breed antipathy in our neighbors through our own careless, scornful or malicious acts.

The problem of noise has long been acute. No doubt we shall become unconscious of the sound of the ordinary passing airplane and indifferent to it precisely as the rattle of trolley cars and the ceaseless clamor of trucks through the streets before our urban homes has ceased to disturb our slumbers. We can look forward to that

with confidence. But there are some circumstances under which the sound of the present-day airplane can hardly be ignored.

It forces itself upon the attention of the immediate neighbors of an airport, but airports are commonly in areas either thinly settled or given over to industrial purposes.

It is a much more serious matter when pilots begin deliberately to fly at a height of a few hundred feet over residential districts. Two years ago complaints on that score were scanty as they always should be. Now they roll in with alarming frequency. Upon Long Island, along the Lake front north of Chicago and in the most attractive suburbs of other cities persistent and unnecessary low flying is becoming a curse,—and many who should be friends of aviation are being turned into enemies in consequence.

It is not merely the noise that is objectionable. The sacrifice of privacy when sight-seeing planes cruise repeatedly past a secluded home only just above the treetops, or even pause to circle about the house, furnishes an equally real grievance. No one has the right to interpose obstacles in the way of the development of air transport for the general good, and no one should have the right to take measures of his own which will enhance the hazards of air navigation, but subject to those limitations the ground-dwellers, including the proprietors of country estates, are entitled to be protected in their peace and seclusion.

The Department of Commerce rules are often flagrantly violated. The evil would be largely ameliorated if all forty-eight states would enact legislation giving the Air Traffic Rules the force of state law, and then properly instruct the local authorities upon their powers to arrest in the event of violation. But that would not be quite enough.

The rules need some broadening. It should be made explicitly clear, for example, that the mere fact that a landing place is always within reach does not excuse the operator of a seaplane from maintaining a reasonable altitude when flying near the shore. It is not only the safety of the occupants of the plane that has to be considered. Except when taking off or landing or when weather compels it, and of course excluding certain industrial purposes, no plane ought ever to be below eight hundred feet when over inhabited land or less than half a mile off-shore.

No rules, whatever care may be taken to make them leak-proof, can stand alone. The real recipe for the avoidance of public disfavor lies in the suppression of individual thoughtlessness. The aeronautical industry has no approbation for those who bring flying into disrepute by making themselves common nuisances. Serious workers in the aeronautical field should make it their business first to warn the pilot who has allowed himself to get into that class, then when indifference or recalcitrance makes it regrettably necessary, to take the initiative in bringing him before the law. One of the most important of the privately controlled flying fields in the east recently formed a "vigilance committee" of pilots who undertook to do just that. We dislike the idea of asking anyone to be on the watch for his neighbor's derelictions, or to constitute himself his brother's keeper, but the consequences of failure to supervise are still more unpleasant to contemplate. We have an interest to protect, the importance of which far exceeds our consideration for any care-free and careless individual.

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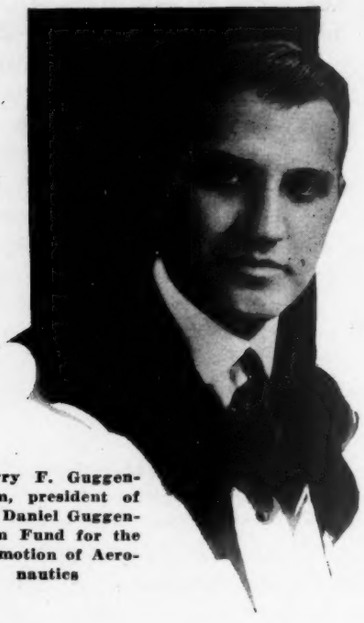
Instinct or Instrument?

AT THE CLOSE of the War it was always possible to start an argument in a group of pilots over the desirability of providing air speed meters and other flight instruments either on service or training planes. The sentiment that no good pilot ever wanted an instrument except tachometer, altimeter, and compass was frequently heard. Those who had learned to depend on instinct themselves resented it that anyone should propose to substitute a mechanism for their delicately developed sense.

No one now denies the desirability of putting flight instruments on service and transport planes. It has been too often demonstrated that blind flying is impossible without their aid, but the difference of opinion over their use on training machines and over the desirability of coming to depend upon them in clear weather continues as strong as ever.

The question is one upon which only experience can render a verdict. It cannot be settled in an editorial, but it wants investigation and settlement. Now that flying schools are being organized on so large a scale and have the most competent management, allied with research organizations, there is an opportunity to study such matters without permitting the individual or collective prejudices of instructors to affect the decision. Admittedly, most pilots have been trained without any reference to air speed meters in their first stages. Admittedly, again, there are some very passable private pilots who keep up their flying continually and never get into trouble, who always keep an eye on their air speed meters and have always done so. One of the best known of British pilots insists on having a broad red line painted upon the dial of the meter at a speed five miles above the calculated minimum velocity of every machine that he flies. Is it a good rule? If not a good rule for everybody, is it a good one for the amateur operating a light plane? How far can instinct and "the feel of the air" be dispensed with? Those are questions which our most prominent flying schools should co-operate in answering.



Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics

A REVIEW OF

The President of th

HARRY F. GUGGENHEIM, former naval aviator and the first licensed pilot to become an American Ambassador, believes commercial aviation has outgrown its infant industry stage and is now taking its rightful place as a vitally important social and economic development. If he did not think so, he declared a few days ago, he would not have accepted the appointment as Ambassador to Cuba, but would have remained here to help promote aviation as head of the Daniel Guggenheim Fund for the Promotion of Aeronautics.

The Fund is now winding up its affairs because the Trustees believe it has accomplished its purpose of "promoting aeronautical education throughout the country; assisting in the extension of aeronautical science, and furthering the development of commercial aircraft, particularly air transportation."

In an interview on the eve of his departure to take up his new duties, Mr. Guggenheim expressed his opinion as to what has been accomplished thus far and what we may expect to see in the next few years.

"A new industry has been established vital to the continuous progress of the United States," he said. "There is every reason to believe that aviation is going through the same stages of development that the automobile industry went through. The airplane is the logical second step to the automobile.

"Two fundamental barriers to aeronautical progress have been overcome—one natural and one structural. They are, fog flying and the solution to certain aerodynamic problems. With aircraft so safe anyone can fly and fog no longer a menace, I believe planes will be built, sold and flown, not by thousands, but by hundreds of thousands.

"Some day—and it is not so far away that we won't all live to see it—flying will be as much a part of our every day lives as driving an automobile is today. Airplanes will travel independent of weather conditions. Of course, I do not mean that we will fly through hurricanes, but ships at sea and even automobiles do not do that.

"When the Guggenheim Fund safe airplane contest is over, I think we will have had an actual demonstration that aerodynamic safety can be achieved. If that is true nothing can prevent mass production of airplanes, and mass production means airplanes for the masses.

"Since the Wright Brothers' first plane, there has been a tremendous improvement in aircraft engines and accessories, but only recently has there been any fundamental improvement in aerodynamics.

"During the war period improvements in safety were a secondary consideration in aircraft manufacture. After the war came the let-down, and aircraft manufactures struggled to keep their heads above water. The change has come in the last year or two, and the Guggenheim Fund has tried to help point the way to this improvement.

"I shall be sorry to give up the work. It has been a wonderful experience. I don't know of anything I have ever done that I enjoyed more."

FOR ALMOST FOUR YEARS Mr. Guggenheim has given the best part of his time and thought to the Guggenheim Fund. When the books are finally closed $3,000,000 will have been spent in the cause of flying. Since January, 1926, when the Fund was established, commercial aviation in this country has seen three distinct stages.

The first might be called the awakening, symbolized by Lindbergh's flight to Paris. In his report as president of the Fund for 1926 and 1927 Mr. Guggenheim said:

"In the last part of 1926 and throughout 1927 a series of spectacular flights has occurred. We have flown to the North Pole; we have flown across the Atlantic and half-way across the Pacific; we have flown at a speed of over 300 m.p.h. and have remained in the air for over 51 hours at a time. The wildest dreams of the aviator have been accomplished and through the efforts of Col. Charles A. Lindbergh aviation has become a common topic of conversation in the households of America.

"In the spectacular there is nothing more to be desired. Ne now face a task of a less dramatic, equally exacting sort—the task of the builder who follows the

Aviation Accomplishments

the Guggenheim Fund Surveys Three Years of Progress

An Interview with Harry F. Guggenheim

By FRANK L. CURTIS

pioneer and gives practical effect to his exploints. A second period in aviation is beginning, the period of its public utility, when the once uncommon airplane becomes a 'common carrier.' "

A year later, in his 1928 report, Mr. Guggenheim said:

"Probably the outstanding aeronautical achievement of 1928 was the demonstration in America by private enterprise that air transport can be made a profitable business without government subsidy. The American pioneer airmail contractors, by their courage and business ability, have surprised the world by this quick and convincing demonstration. Air transportation services have been extended in number and route; output of aircraft has enormously increased, and for the moment lags far behind the demand; and scientific research is approaching a solution of the few remaining aeronautical problems."

In his last report he said:

"In the past three years the public attitude toward aviation has changed from indifference to intense enthusiasm. Not only is there a sound commercial basis for aviation, so that it can from now on take care of itself, but there have been established in various geographical sections of this country aeronautical engineering and research centers, which are second to none in the world.

"These centers, connected with great universities, are an earnest of a continuous contribution to the new science of aeronautics. With commercial aviation assured of public support and aeronautical science equally assured of continued research, the further development of aviation in this country can best be fulfilled in the typically American manner of private business enterprise."

DISCUSSING the possibilities of this development, Mr. Guggenheim predicted that commercial transport planes will soon be flying across the continent at a speed of 200 m.p.h.

"That is a perfectly reasonable figure," he said. "We already have commercial planes that can cruise at 150 m.p.h. When we have retractable landing gears and other features to reduce air resistance, 200 m.p.h. is not too much to expect.

"Greater speed will introduce an entirely new economics of aviation. Dawn to dusk flights with passengers between New York and San Francisco or Los Angeles will become a daily routine. Distances, which have already been more than cut in half, will be cut in half again.

"I believe the time is not far away when we will be flying from New York to Santiago, Chile, in 25 hours."

The future of transoceanic air transport, Mr. Guggenheim believes, depends upon improved airplane efficiency or the practicable development of refueling bases at sea such as the seadrome now being built to serve as a halfway station between New York and Bermuda.

At present, flying across either the Atlantic or Pacific oceans in heavier-than-aircraft is economically unsound, because of the heavy fuel load. Dirigibles may solve the problem, he thinks. One of the last acts of the Guggenheim Fund was the establishment of an airship institute at Akron, Ohio, to aid lighter-than-air development.

He sees a great future for airplane transportation between North and South America, however. In an an address last summer before the Institute of Politics at Williamstown, Mass., he submitted a table of travel time between Washington and the capitals of Latin America on the basis of continuous flight at 200 m.p.h.

Between Washington and Havana, for instance, the present rail and steamship journey requires 42 hours; in a 200 m.p.h. plane it could be accomplished in less than eight hours, he pointed out.

Mr. Guggenheim's trips between Washington and Havana as Ambassador may not be made at the rate of 200 m.p.h., but he intends to fly whenever he can.

"I am going to take one plane with me to Cuba—possibly two. If I can save time and if it is convenient, I will always fly in preference to taking a train or a boat," he said.

WHAT OF THE 1930 National Air

Some Opinions and Suggestions of the 1929 Competitors Regarding 1930 Commercial Air Classic

By JOHN T. NEVILL
Detroit Editor of AVIATION

WHAT are the problems of next year's Tour? Laying aside for the time the routine problems of any event of its kind, how it shall be financed, how it shall be managed, when it shall be held, and what route it shall follow, we will plunge into what appears to be its most acute problem in this stage of its history—what changes shall be made in the rules and in the formula?

Immediately following the 1928 National Air Tour pilots and aircraft executives participating in that event voiced very strongly their disapproval of the formula by means of which competing craft are scored, this formula being contest load, multiplied by maximum speed, over "stick" plus "unstick," multiplied by 50 over engine displacement. The formula, according to these complaints, did not give all of the entries the same "break."

"Stick and unstick" played too large a part in the winning and losing of the Tour. "Stick," "unstick" and speed, all-important factors in the formula, should be measured at every control point over the route, instead of using the Ford Airport tests as the measuring stick for the entire course. The Tour was won or lost in the pre-Tour tests and the plane with the comparatively small "figure of merit" had no chance. Fuel consumption should be made a factor in the formula. Stopovers should be longer. Stopovers should be shorter. The legs should be made longer. The legs should be made shorter. More laps per day should be flown. Only one lap per day should be flown. Competition in the Tour should be divided into two or more classes. A new formula should be devised to cover all classes. Racing should be discouraged. The Tour should become a race. Propeller settings should remain uniform. The National Air Tour should be financed and managed by a "National Air Tour Association." Passengers on the Tour should be replaced by sand or tools. Sand should be replaced by passengers. A better system of publicizing the Tour should be adopted. And on, and on, and on.

Some of these complaints and suggestions were new to those responsible for promoting and sponsoring the Tour. Some of them, particularly those relative to the formula, had been heard following previous Tours. However, as had been done to some extent following previous occasions the Tour Committee considered each and every one of the suggested changes, acted upon some of them, and rejected others. Thus, it was that the 1929 Tour, though, in the main, resembling its four predecessors, embodied in its rules, in its formula, and in its

Edsel Ford starting the 1929 Tour. Peter Altman, dean of Aeronautics at Detroit University, in charge of weighing and ballasting Tour planes, looks on

Tour?

the Problems Confronting the

John H. Livingston, winner of the 1929 Tour

practices, a number of changes aiming toward a better, more satisfying, and more valuable event.

In order to reduce the importance of "stick" and "unstick" the formula was altered to include only half the stick. Approved type certificates were demanded whereas "letters of credit" had been allowed. Planes were required to main at least 85 per cent of their displayed maximum speed, instead of 80 per cent. Only one two-day stopover was listed on the itinerary. "Billboard" planes, or those carrying the names of firms not in the airplane manufacturing business, or the products of such firms, were barred from competition. Costs of the Tour to cities visited by it were reduced, and a new system of taking care of the personal needs of the Tour personnel introduced. The Tour, in fact, was placed under new management, and blossomed forth with many of the alterations expected of a new management.

THE 1929 AIR TOUR has been called the most successful thus far held. Perhaps it was. Twenty-nine competing pilots and approximately a dozen official and accompanying craft left Ford Airport, Detroit, on October 5. Twenty-five of the contestants, all except one of them still in competition, completed the 5,000 miles and returned to Ford Airport on October 21. A twenty-sixth entry had been damaged in a forced landing under severely trying flying conditions on the very last leg of the route. The contestant not in competition at the finish flew virtually the entire mileage, but was withdrawn by the manufacturer because of engine trouble. All of the accompanying craft completed the grind with a reliability record not to be overlooked.

The Edsel B. Ford trophy and the first cash prize of $2,500 went to John H. Livingston, who flew a 225 hp. Wright Waco. A total of $9,500 was distributed between the next nine winners. Nearly $4,000 was divided between the remaining contestants. No contestant filed a protest, and every one seemed satisfied.

Yet, are the manufacturers who enter planes in the Tour, and the pilots who fly those planes really satisfied? The answer is both yes and no. They are, perhaps, satisfied that the Tour is worth-while; that it is highly educational both to the public and to the trade; that it represents a very practical experimental laboratory where their products' performance can be measured alongside that of a competitor; that it affords them an opportunity to broaden acquaintanceship and build up good-will; and that it can be made into a valuable sales medium. All of this is evidenced by the fact that, year by year, the entry list expands.

Unfortunately, the above cannot be said about the formula or about all of the Tour rules. It is reasonable to assume that the industry—particularly that portion of the industry that is usually represented in the Tour—is not completely satisfied with the formula and with certain of the rules as they now stand. Most of this dissatisfaction is leveled against the stick and unstick factors in the formula. Much of it, however, goes farther and would have the rules changed along various lines. Some of the critics also have offered suggested alterations in the general practices of Tour management.

Unofficially, this writer feels safe in saying that all of the criticism and all of the suggestions for betterment of the Tour is appreciated and is welcomed by the donors of the Ford trophy and the sponsor of the event. The Detroit Committee, of course, feels that the Tour has well served its purpose, and that it is far more than "worthwhile." It realizes that the scoring system is not all that it might be, and it stands ready to discard the present formula whenever a better one is advanced. It appreciates that the rules are not flawless, and un-

doubtedly would make changes to suit a majority of the interested manufacturers. Briefly, the Committee holds that the National Air Tour is the industry's own and is not designed to give advantage to any one manufacturer's plane, or any one type of plane. During the past five years, the Committee believes, the Tour has been at least partly responsible for some very constructive steps toward safer, more reliable, and more efficient airplanes. And it sees no reason why that work cannot and should not be continued.

NO PERSON is better qualified to point out the shortcomings of the Tour formula and of the Tour rules than the pilot who has competed in the classic, or the man who has acted in some official capacity in the event. The recent National Air Tour included in its personnel a number of men whose opinions of those important phases of the Tour were well worth soliciting. All of those men, be it understood, were not competing pilots. Some of them were not pilots at all, but were officials of the event. Some were pilots who were competing in the Tour for the initial time, but whose background was such as to make their views interesting. Others were men who had competed for the Edsel Ford trophy before and were well acquainted with the various problems facing the National Air Tour contestant.

Through the full-hearted cooperation of Captain Collins and Capt. Frank M. Hawks, Official Tour Referee, the writer was enabled to sit in at a breakfast during the last stages of the recent Tour at which the views of each man present was recorded. From this meeting a fair cross-section of what the air tour needs in the way of change was gained.

John H. Livingston, the 1929 Tour victor, had no recommendation to make relative to the stick and unstick factors in the formula, but stated that he thought "there should be two or three classes of planes competing separately in the Tour."

"Especially," he said, "should there be a light class and a heavy class, although the present formula mixes the planes up pretty well. I think, though, that the penalty for arriving late at a control point should be increased."

Mr. Livingston, who has been a contestant in the Tour before, and whose victory this year gave Waco Aircraft two consecutive triumphs in the annual classic said that the advances in design had been such during the past year that the plane used by the late Maj. John P. Wood in winning the National Air Tour last year would have had difficulty placing in tenth this year.

Although he is not an airplane pilot the views of Arthur G. Schlosser, official scorer on the Tour for the past two years, deserve a great deal of attention. Mr. Schlosser, an aeronautical engineer and balloonist of international reputation, is a member of the engineering staff of the Detroit Aircraft Corporation, and is credited with much of the engineering work on the Navy's all-metal dirigible, ZMC-2.

"The ideal formula," Mr. Schlosser stated, "would disclose the plane carrying the greatest load the fastest at the least expense. I would lessen the importance of stick and unstick in the formula, or eliminate it entirely. Perhaps it would be better to use the cube or the square root of the sum of the stick plus the unstick, then divide it into the load multiplied by the speed. That would give the larger plane with the slower landing and take-off capacity a more equitable divisor and do much toward preventing the plane with less horse-power, less carrying capacity and less speed from running away with the Tour because it can land and take off within a few seconds. More, larger and better airports all over the country have reduced the importance of building planes that will land and take off in a very short space.

"I believe that an entry's actual speed should be used in arriving at its points for a leg, rather than permitting the plane to maintain only 85 per cent of its maximum speed shown in the pre-Tour tests. What we are trying to do is to demonstrate the safety, reliability, speed, economy, and comfort of air travel. Yet we must have a contest. There must be some fluctuation in the day by day scores during the progress of the Tour or the manufacturers will lose interest.

"Some formula should be designed to take in fuel consumption but there seems to be no practical way to do this. I think fuel consumption should be used in the formula instead of engine displacement. Another type of craft we soon will have to consider is the amphibion. If a plane can fly off either water or land some recognition should be made of that fact either in the formula or the rules. Some credit should be allowed for an entry's ability to discharge its passengers in the heart of a city.

"Aside from its technical aspects there also is a need for more showmanship on the Tour. Carefully planned and skillfully carried out showmanship never hurt any venture. Conversely, clever showmanship has meant the saving of a lot of things. It occurs to me that the Tour should carry along its own official spokesman. This spokesman should be a man who, not only is qualified to talk on the subject of air travel, but a man who *can* deliver an interest-holding address."

CHARLES W. MEYERS, chief test pilot for Great Lakes Aircraft Corporation, Cleveland, who has competed in the Tour more than any other man, favors the taking of stick and unstick figures at each control point on the theory that it "would prove the pilot and the plane under general flying conditions."

"I fully realize," Mr. Meyers said, "that this would mean a lot of work, but it would be worth-while. We could send our own timers around the route in tri-engined planes, one plane load going in advance to clock the contestants' landings, and one remaining behind to time the take-offs. Skilled men for this work could be obtained from the various factories—particularly from the engineering department. This method would give the contestants a different figure of merit for each leg and would prove both the pilot and the plane under the general conditions of cross country flight.

"I also believe that the competing plane's actual speed should be taken into consideration in the formula. If this was done it would prove the pilot's ability to navigate. As the formula is now, no one contestant has a chance to gain on the man ahead of him, unless his figure of merit is larger, or, unless the pilot ahead of him meets with engine trouble or a mishap. By charging a man up with his actual speed and by clocking each one of his landings and departures much of that state of affairs would be eliminated.

"Since this is a manufacturer's event the manufacturers should be permitted to enter experimental planes. The Tour, in fact, should be a sort of proving grounds for new planes. It should serve the two-fold purpose of exhibiting the manufacturer's new and experimental type plane to the public, and at the same time demonstrating it to its builder. I believe that the Tour's principle benefit is educational, rather than sales promotive. And much

of that educational work is contained in the facts about his own plane learned by the manufacturer during the Tour.

"Although I do not believe that demonstrations of the plane with a view toward sales are necessary, I would eliminate one of the two jumps now being made daily over the Tour route. One leg per day is plenty. I also would suggest a rule prohibiting pilots to change their propeller settings after having run through the stick, unstick and speed tests, this rule to prevail so long as those tests are made once and for all at Ford Airport before the Tour start."

In order to encourage competition in the light plane class it will be recalled that Great Lakes Aircraft Corporation last week announced a Great Lakes Light Plane trophy to be awarded annually to the National Air Tour plane with an engine of 510 cu.in. displacement, or less, and scoring the highest among Tour craft of its class.

The Tour formula should make some allowance for the pilot who loses time on one leg and makes it up on the next, in the opinion of C. G. Andrus, of the United States Weather Bureau, who has officiated for the past two years as the Tour's official "weather man." Mr. Andrus, at one time a balloonist of considerable reputation, has for the past several years been devoting his full time to gleaning and distributing aeronautical meteorological information at Hadley Field, N. J., and, more recently, at Cleveland Airport. "Stick and unstick," said Mr. Andrus, "should be thrown out of the formula entirely. Actual speed should be used. That would stimulate better piloting and better navigation, particularly with regard to the fullest utilization of weather conditions. The Tour also could be used to encourage increased cruising radii of airplanes. This could be helped along by making the laps longer."

"Take out the stick and the unstick," is also the suggestion of R. W. (Dick) Pears, who has competed in the Tour for the past two years flying Fairchild planes. Mr. Pears also agreed with others that actual speed should be used instead of the 85 per cent required. "Use actual speed," he asserted, "and that will stop the changing of propeller settings. I also would suggest compelling the planes to carry their respective gross load. So long as planes are advertised to carry a given load what is the sense in having them go around the Tour route carrying only a percentage of that load." (Following stick, unstick and speed tests at Ford Airport, National Air Tour contestants are permitted to reduce their Department of Commerce allowable useful load to 75% of that figure.) "We are supposed to be demonstrating to the public what our planes can do. Then let us have them do it. I also think the Tour stopovers should be lengthened for commercial reasons."

ALTHOUGH OF THE BELIEF that no radical changes are needed in the formula, Captain Hawks, Tour Referee, is an enthusiastic advocate of Mr. Schlosser's suggestion that either the square or cube root of stick plus unstick be used. Captain Hawks also would lengthen the legs, use actual speed, and "make the Tour more like a real race."

"There really is no need for any radical alteration of the scoring system," Captain Hawks asserted, "but something should be changed to make the Tour of more interest to the pilot, to the manufacturer and to the public. Just now it is cut and dried, and practically settled before the planes ever leave Ford Airport. Some pep should be injected into it. I would suggest making it more like a real race, when the same pilot would not be in the lead all of the way around. I am in favor of using the plane's actual speed, and of using either the square root or the cube root of the sum of stick plus unstick. I also would like to see the leg mileage lengthened somewhat."

"The National Air Tour," said Roger Q. Williams, trans-oceanic flier, who accompanied the recent classic flying a Columbia Triad amphi as one of Captain Collins' assistants, "gives people a chance to see a real flying aircraft show. I would suggest confining the route to the smaller centers. There seems to be more interest in the smaller towns. Next year there will be amphibions in the Tour, and some provision should be made for them in the rules. Amphibions will prove greatly interesting to those in inland cities because they see so few of them. Fuel consumption, it seems to me, is much more important than stick and unstick. I also favor longer hops and longer stops."

ALTHOUGH Reuben Wagner, pilot of the Wasp powered Boeing 95 in last month's Tour, had never before competed in the event, his views should be of great value because of his abundant experience in flying the mail. After all a considerable percentage of any success realized in flying the Tour is due to sheer piloting ability—the ability to remain on one's course, take the best possible advantage of the weather across one's course, and arrive at a control point within the allotted time, conserving, meanwhile, one's engine as much as time will allow. And no pilot should be more qualified to do that skillfully than the veteran air mail or passenger line flier. "My only suggestion," said Mr. Wagner, "is that actual speed be used in the scoring, and that a heavy penalty be created for engine failure. Such a rule would insure care of the engines. Pilots would get the best speeds out of their planes without abusing their power-plants."

Dale (Red) Jackson, of re-fuelling endurance flight fame, who piloted a Wright 225 engined Curtiss Thrush, agreed with a number of the others that stick and unstick should be banished, that actual speed should be used, that gross load should be carried, that propeller settings should remain constant, and that the legs should be lengthened. Mr. Jackson, however, disapproved of the rule allowing a contestant only two hours to work upon his engine.

Relative to increasing the leg mileage Jackson said he believed the laps should be lengthened to at least 300 miles and that the afternoon hop should begin at 1 p.m. in order to allow the contestants time to arrive at their destination and demonstrate their planes, "should they care to do so."

William Welborn, who flew a 5 cyl. Wright powered Spartan, a craft never before entered in the Tour, was of the belief that the "stick and unstick factor should be altered but not eliminated entirely." Using the square root of the sum, he believed, would help considerably. Mr. Welborn also suggested that engine trouble be penalized in accordance with the particular difficulty encountered.

Steve Lacey, pilot of one of the Tour's three Cessna entries, strongly favored the adoption of the square root of stick plus unstick idea, and advocated as well the using of actual speed.

George W. Haldeman, who this year was no newcomer to the fold of National Air Tour pilots, expressed himself as favoring the classification of Tour entries. In both the 1928 and the 1929 Tours Captain Haldeman has piloted a Bellanca monoplane.

Standardization of SMALL

By John F. Hardecker
Chief Draftsman, Naval Aircraft Factory

Many industries have found standardization work the key-note to economical production, distribution, and servicing. The aircraft industry is just beginning to recognize its importance, and to co-operate heartily in promoting the adoption of new standards where feasible. Mr. Hardecker points out that the standards for minor parts has seriously lagged in the engine field. As a means of promoting the standardization work in which he is actively engaged, and in which the entire industry should be extremely interested, it is suggested that all those having suggestions for particular standardization projects within the field covered by this article, or who have data that they think should be taken into account in framing standards send them to Mr. Hardecker in care of AVIATION.

MODERN industry holds no parallel more striking than that between aeronautical achievement and the development of the aircraft power plant, as exemplified primarily by the aircraft engine. As goes the engine, so goes the plane, and all the tremendous contingent organization representing a great industry. So in a major development as great and significant as the modern aircraft engine, it is perhaps natural to find each engine manufacturing organization presenting an almost exclusive concentration upon fundamental principles, technical essentials and immediate production. Small matters must give way to the drive for the big idea, for there is literally no time available for retrospection and critical analysis of minor economies.

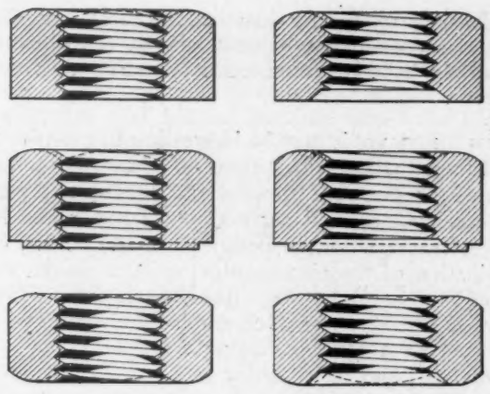
Yet, somewhere along the line of march of progress toward the ultimate objective of any industry, time and opportunity must always be provided for a few, who, without halting the forward movement of the main body, plan for basic cooperative economies that will simplify and reduce the work of the major forces. Standardization, in its broadest aspects, is one of these basic cooperative economies. Standardization, from a purely theoretical conception, is most easily introduced at the inception of an industry, yet from a practical viewpoint, it is necessary that the industry reach a reasonable degree of stability before such work is best attempted. The airplane building industry, as distinguished from the aircraft engine industry, found it expeditious to introduce standardization of small parts many years ago, so that it is now so well established as a vital part of plane manufacture, that few can even recall its humble beginnings.

It is axiomatic of standardization activity, that once properly launched in an industry, it automatically gathers momentum and volume, so that in a short time it becomes necessary to restrain rather than to foster the widely enthusiastic activity of its newest proponents. That standardization of small engine parts, commonly called engine hardware, is inevitable is a generally accepted fact, the debatable point being only as to the time in the history of power plant development most favorable for its introduction.

Introduced too early in an industry's development, standardization either tends to a limited degree to retard development, or by its very failure to predict fundamental trends, defeats itself and falls into bad repute. Held back too long, so that individual assembly designs become permanently established and there are no new models to which it may be economically applied, for standardization activity should never be retroactive, it again lacks the proper essentials for success. Therefore, there is a particularly proper time for the introduction of standardization activity, and to analyze the current situation with respect to small engine parts, in the belief that the present is that time, is the primary purpose of this article.

Fortunately, the machinery of standardization has already been introduced into the aeronautical engine field by the activity of the Society of Automotive Engineers and the Army-Navy Standard Conferences in their work in standardizing installation and interchangeability dimensions for certain power plant accessories essential to the aircraft engine. In considering small engine parts,

ENGINE PARTS



Variations in plain hexagon nuts

however, the investigation must go far deeper, for it is unfortunate that at the present time many of these small engine parts are interchangeable as far as substitution physically of one for the other is concerned, though they differ radically in strength and utility. Therefore, small engine parts standardization must go all the way, and completely define a part, similar to that now in universal use for structural aircraft bolts, nuts, shackles, etc.

IT MAY BE WELL at this point, in order to avoid confusion to define in a general way just what is included in the term aircraft engine hardware. This is applied to those small parts used in engines and engine accessories which fulfil a general function, and which may be used under ordinary circumstances wherever that function occurs. Specifically, these small engine parts include all types of bolts, nuts, screws, studs, washers, gaskets, keys, pins, lock rings, etc., used on all types of engines, generators, starters, carburetors, magnetos, fuel pumps, etc.

At the present time, each engine or accessory manufacturer prepares independent detail drawings of such parts, assigning his own part numbers to them. In many cases, the same identical small part receives a new part number of a given engine manufacturer each time it is redetailed as a component part of a set of engine plans for a new model. In other cases, while each small part is individually detailed for each engine assembly, tabulated drawings showing the range of sizes of a given detail design are not publicly available, and when maintained for private use, show no consistency or relationship in the assignment of part numbers for tabulated variations. In at least one case, separate part numbers are utilized for the identical small part in the two component divisions, engines and planes, of a single aeronautical organization.

The situation outlined with respect to part numbering is not presented in a spirit of criticism, but merely to indicate an existing condition, fostered by circumstances peculiar to the rapid expansion of the aeronautical engine industry. Bearing in mind that the condition outlined is in no wise dependent upon technical differences, either intentional or incidental, but is basic, and applies

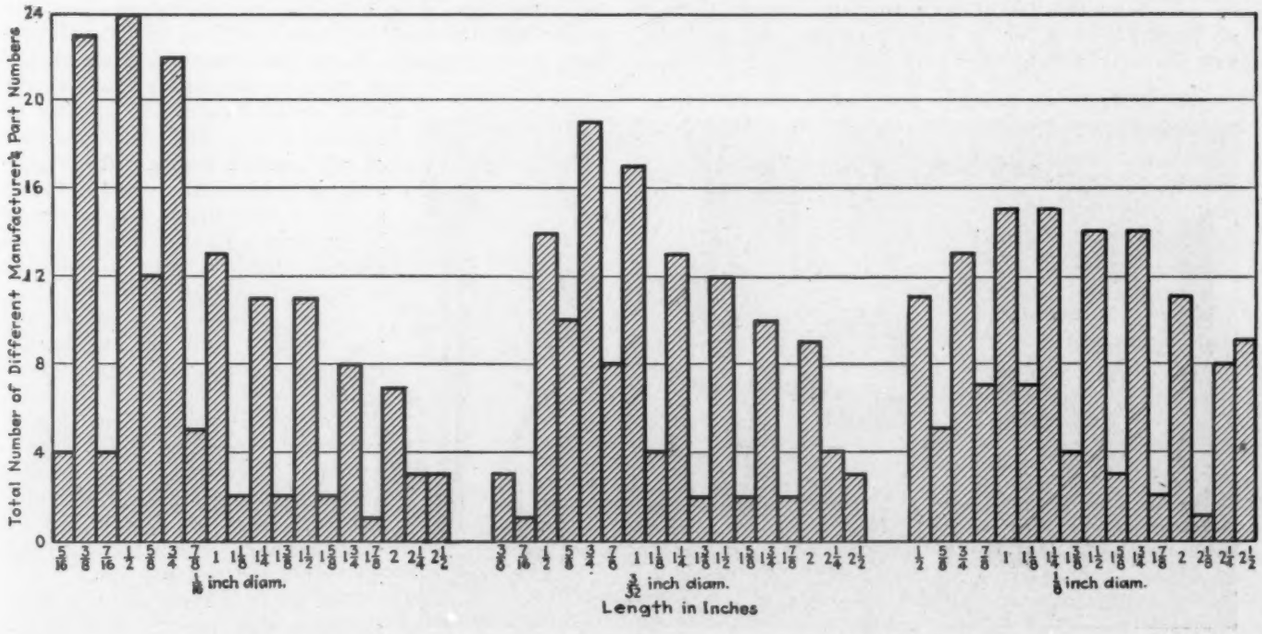


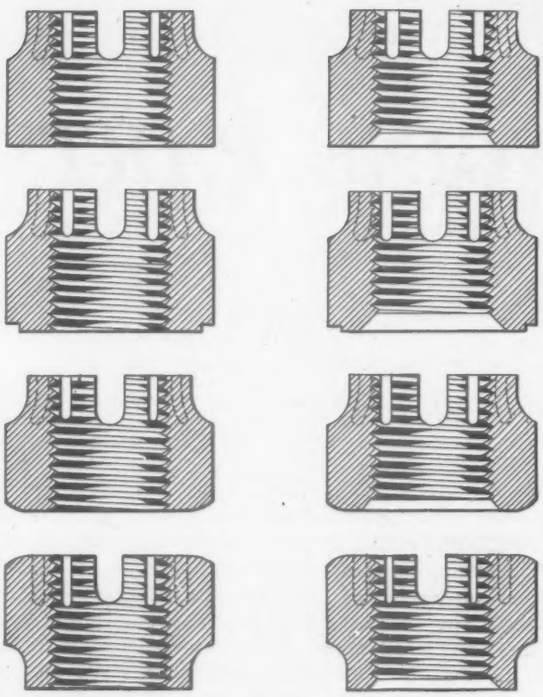
Diagram showing number of different part numbers assigned to each size of cotter pin

equally well to exactly identical physical material, the difficulties engendered by this lack of coordination for the supply base or commercial operating unit are self apparent.

IN THIS REGARD, it may be interesting to examine in detail the situation with respect to cotter pin numbering, since cotter pins are specified as commercial products in every instance, and for a given diameter and length, there is no variation in design or material. A critical examination of the part numbering of a limited number of engine manufacturers, discloses a widely varying range of numbers for each commercial cotter pin size, climaxing in a total of 24 part numbers for the $\frac{1}{16}$" diameter $\frac{1}{2}$" long steel cotter pins. When we contrast this to the structural airplane field, where practically all manufacturers use a single Standard part number (AN380-2-2) for this size cotter pin, the unnecessary complicity of the small parts situation in aircraft engines is at once apparent.

True, there is no technical knowledge required to recognize the similarity existent in these various part numbers as far as cotter pins are concerned, yet the same situation exists for other small parts where there are possibilities of technical distinctions which must be investigated, before similar assumptions can be made. Even though these may be easily recognized by the engineer, it must be borne in mind that in the field these parts are handled by storekeepers, mechanics and helpers, and that too often the mere fact that a part of one manufacture will fit where that of another is specified, is taken for granted as an indication of a permissible substitution, with entire disregard of material strengths, special features, etc.

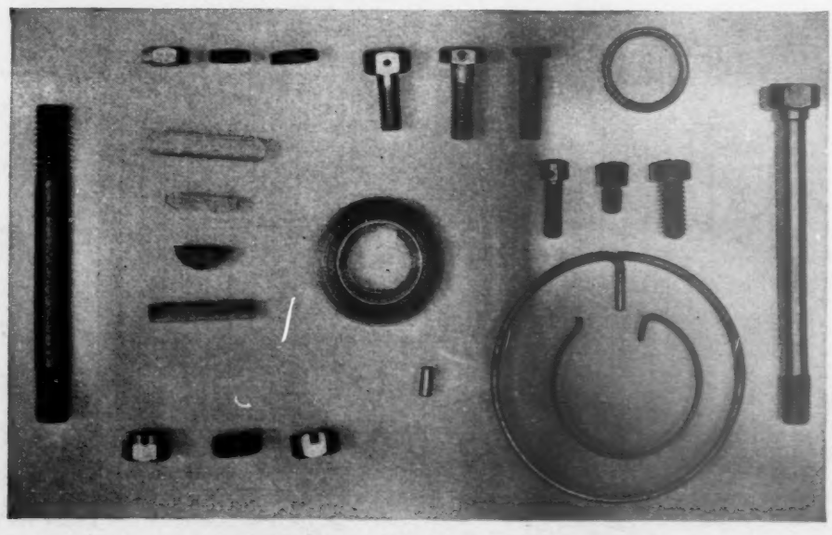
It will probably be well to outline the detail variations discovered in a few small engine parts, in order to illustrate fully the urgent current need for standardization. In doing this, it is done with the full consciousness of the fact that in a few pertinent cases, the apparent irregularity of a certain part may be so advisedly, in that it has a highly specialized function peculiar to its particular application to perform, and that it needs must be so. With the use of such specialized parts there is no intention to differ or suggest change, but with the vast majority, which differ only because individual minds



Various castellated nuts

in individual organizations cannot be expected to all simultaneously arrive at the same detail sizes, dimensions, materials and tolerances, unless guided by some predetermined standard to which all are agreed in general principle, there is the intention to point out the need for coordinated cooperation.

IT IS A PECULIARITY of standardization activity that it usually requires the endorsement of executives capable of grasping the future significance of and as yet undetailed principle, requiring a certain amount of revised routine work in its initial applications, while at the same time, it requires the cooperation of those familiar with the most intimate details of design. Therefore it is necessary to go into these intimate details in order to thoroughly establish the need for all concerned. It must be realized that a full detail analysis of all possible engine parts standards is beyond the scope of this article, so that the ones chosen may be properly regarded as only an indication and in no wise a limitation of the ultimate possibilities.



Typical small engine parts suitable for standardization

Engine Nuts — The number and type of nuts used for engine and engine accessory work are literally legion. While certain types predominate, it is not at all unusual to encounter types that defy classification. Therefore, this detailed analysis wil lconcern itself with only the two most common types, the plain flat hexagon nut and the regular castellated hexagon nut.

The six basic types of plain hexagon nuts now used in aeronautical power plants are shown in Fig. 1. In

addition, each of these types may have one or three cotter pin holes drilled thru them, and the types may all have the sharp vertical outside edge rounded off in certain cases. Some of these nuts have a groove cut horizontally around the corner for a safety wire seat, and some are slotted for cotters with one or three slots.

The materials specified, in addition to the predominating steel, are brass, dural, bronze, aluminum and Tobin bronze. The majority of steels are specified by the engine manufacturer's material specification number, necessitating a cross reference to his specification before they can even be identified, and in many cases this means a steel special in some respects. Where the steel is more generally specified, the material ranges all the way from cold rolled steel, SAE1020, SAE1025 and medium steel to SAE2330, SAE3135, SAE6150, and SAE6135. In certain cases, schleroscope readings of various ranges are specified. In the steel nuts alone, this immediately discloses the possibilities of serious consequences incidental to substitution of one engine manufacturer's product for another in the field, provided the physical dimensions are such as to make it possible.

THE MULTIPLICATION of size and thread combinations now existent are shown in the following table, which alone indicates the urgent need for standardization on certain sizes, and a single thread designation for each size.

Size and Threads Used in Plain Hex Nuts

No. 8-32	7/16 in.-18	5/8 in.-16	1 1/16 in.-16
No. 9-24	1/2 in.-32	11/16 in.-24	1 1/8 in.-20
No. 10-32	1/2 in.-24	11/16 in.-16	1 1/8 in.-18
No. 10-30	1/2 in.-18	3/4 in.-20	1 1/8 in.-12
No. 10-24	1/2 in.-16	3/4 in.-16	1 1/4 in.-18
No. 12-32	9/16 in.-24	3/4 in.-10	1 1/4 in-16
No. 12-28	9/16 in.-20	7/8 in.-20	1 1/4 in.-12
No. 12-24	9/16 in.-14	7/8 in.-18	1 5/16 in.-12
No. 14-24	5/8 in.-20	7/8 in.-14	1 3/8 in.-12
5/16 in.-32	5/8 in.-18	15/16 in.-16	1 3/8 in.-16
3/8 in.-28	5/8 in.-12	15/16 in.-14	1 3/8 in.-12
7/16 in.-20	5/8 in.-24	1 in.-20	1 5/16 in.-16
5/16 in.-24	5/8 in.-18	1 in.-14	

With respect to the most simple dimensions, the greatest variations now exist. The variations in combinations of distance across the flats and height of nut, for but a single size is shown in the following table:

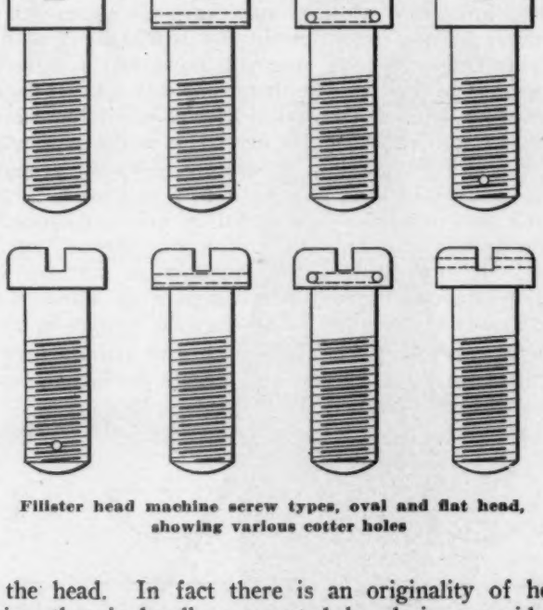
Combinations of Distance Across Flats and Height on 1"-28 Nuts

Flats	Height	Flats	Height
1 in.	1/2 in.	15/16 in.	11/16 in.
1 in.	29/32 in.	15/16 in.	29/32 in.
1 in.	3/4 in.	15/16 in.	3/4 in.
15/16 in.	5/8 in.	15/16 in.	5/8 in.
15/16 in.	27/32 in.	15/16 in.	27/32 in.
15/16 in.	25/32 in.	15/16 in.	25/32 in.

Additional variations noted include range of 90 deg. to 110 deg. in the thread countersunk angle, the specification of "machined all over" or "corners broke," and the bottom face square with the thread within .001", .002", .003" or .005". The class of fit varies over a full range of 1—Loose Fit, 2—Free Fit, 3—Medium Fit, 4—Close Fit and 5—Wrench Fit. The finish on steel nuts includes cadmium plate, zinc plate, plain, sherardized and dull or polished nickel plate.

The eight basic types of castellated hexagon nuts (Fig. II) are subject to all the variations of size, material, dimensions and tolerances pointed out for the plain hexagon nut, the details of which will not be repeated here. In addition, the slot introduces another variable in that it may be square, filleted or full radius at the bottom, according to the individual engine manufacturer's design desires.

All of what may be considered as the eight basic types of fillister head machine screws (Fig. III) vary as to the number of threads per inch for a given diameter, the percentage or amount of length threaded for each given diameter and length, and the detail dimensions



Fillister head machine screw types, oval and flat head, showing various cotter holes

of the head. In fact there is an originality of head design that is hardly warranted by design considerations and limitations.

The materials specified include the following steels: Stainless steel, SAE1112, SAE 6150, SAE6135, SAE-2330 and cold rolled steel, with occasional varying schleroscope test figures. In addition, brass, dural and Tobin bronze are also used as materials. Finish on the steel screws include cadmium, zinc and nickel plate.

Woodruff Keys—Four basic types of Woodruff keys are shown in Fig. IV. Some are designed with sharp corners, and some with chamfers to break the edges. Both the radius and thickness vary for identical sizes. Where an incomplete radius is used, the amount of the straight portion remaining is variable.

The material in addition to being specified by manufacturers' specification number, with the consequent necessity for cross reference and resultant detail variation, includes the following descriptive terms: nickel steel, cold drawn key stock, tool steel, cold rolled steel, nickel steel treated, drill rod and mild steel, with occasional specification of Brinell and Rockwell hardness readings.

Straight Keys—Some of the basic types of straight keys are shown in Fig. V., additional variations involving cut off corners, and chamfer corners on one or both sides. Material variations parallel those for Woodruff keys.

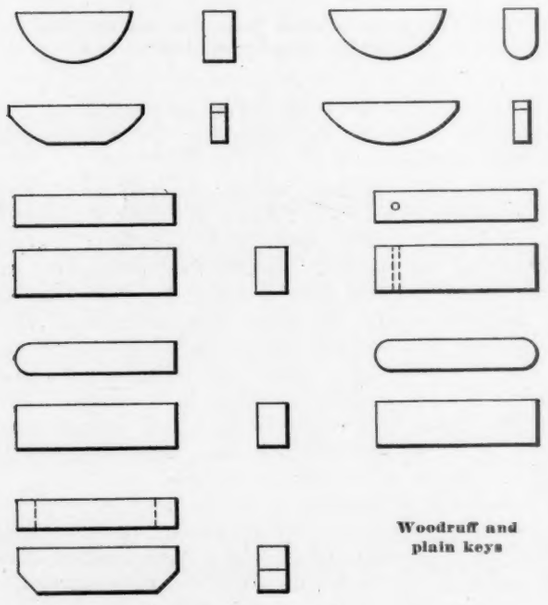
The foregoing gives in a brief way the existing variables for a few small engine parts. It is considered that further details would be beyond the scope of this article, and would serve no additional useful purpose in establishing the current situation. For some of these variations, and similar ones in parts not presented in detail analysis, there is probably, as previously pointed out, reasonable justification for the variation. But in the vast majority of instances, these detail variations

literally represent "accidents of birth," easily controllable by proper standardization. The multiplicity of design information incorporated in existing designs certainly provides a proper basis for standardization analysis, and well indicates that the present is an eminently proper time to undertake this activity, which is best defined as "common sense applied to creative individualism for the purpose of achieving the greatest good for all."

The foregoing, while it may leave an impression of a rather chaotic condition in the small parts field in aircraft engine design, may still have that feeling accompanied by the thought that while this appears highly distressing from a theoretical viewpoint, it has nevertheless, not been a serious deterrent in the attainment of efficient engine design. Therefore, since the proposed small parts standardization is a new endeavor, it may be felt that it will be surrounded by inherent handicaps to production that may well offset its "logical" advantages. In opposition to this thought, it may be well to reiterate certain general advantages of standardization already established, in terms of the subject in hand.

It permits the engine manufacturer to manufacture or purchase small engine parts on a mass production basis, thus reducing costs.

It concentrates on a lesser number of sizes and types,



Woodruff and plain keys

thus encouraging improvements in production methods that will ultimately reduce waste and costs.

It encourages wider competition between specialized small parts manufacturers through a standardized product.

It permits the parts manufacturer to accumulate stock, thus reducing the inventory necessary for the engine manufacturer to carry.

It reduces drafting work on design, as standard parts may always be referred to by part number.

It facilitates the interchange of parts on engines manufactured by different manufacturers, reducing the stock necessary to be carried by jobbers, airplane operators and supply bases. Any loss of profit to the engine manufacturer gained through the supplying of replacement parts direct will be more than offset by the reduction of initial cost and the elimination of nuisance business centering in small orders.

It facilitates replacement and emergency repairs by making parts more readily procurable from the nearest jobber or commercial distributor instead of from the engine manufacturer alone.

It coordinates and simplifies all design data, and encourages the creation of charts, tables, etc. to facilitate design.

It makes available commercially the best possible technical material, usually at a cost less than that of the poorer grades indiscriminately used.

It eliminates the menace to safety now possible by careless interchange of parts from different engine manufacturers which vary greatly in strength characteristics.

It permits of simple associations of dimensions with part numbers in tabulations (i.e., dash numbers corresponding to lengths in sixteenths of an inch) that make part numbers easily identifiable by constant users without direct reference to blueprints.

GREAT AS the advantages of standardization appear and really are, it is necessary to incorporate a word of caution, for standardization after all is not a universal panacea without momentary discomforts and the need of time for its results to materialize. It does to a certain extent require extra work during the period of transition, and a reasonable attitude must be shown during this period. Troublesome though it may be, the opposition advanced against the standardization of small engine parts in one instance, based on the fact that if the current AN standard type of part number were used, it would result in a number too long for the accounting forms being used, does not seem justifiable in terms of the obviously greater advantages.

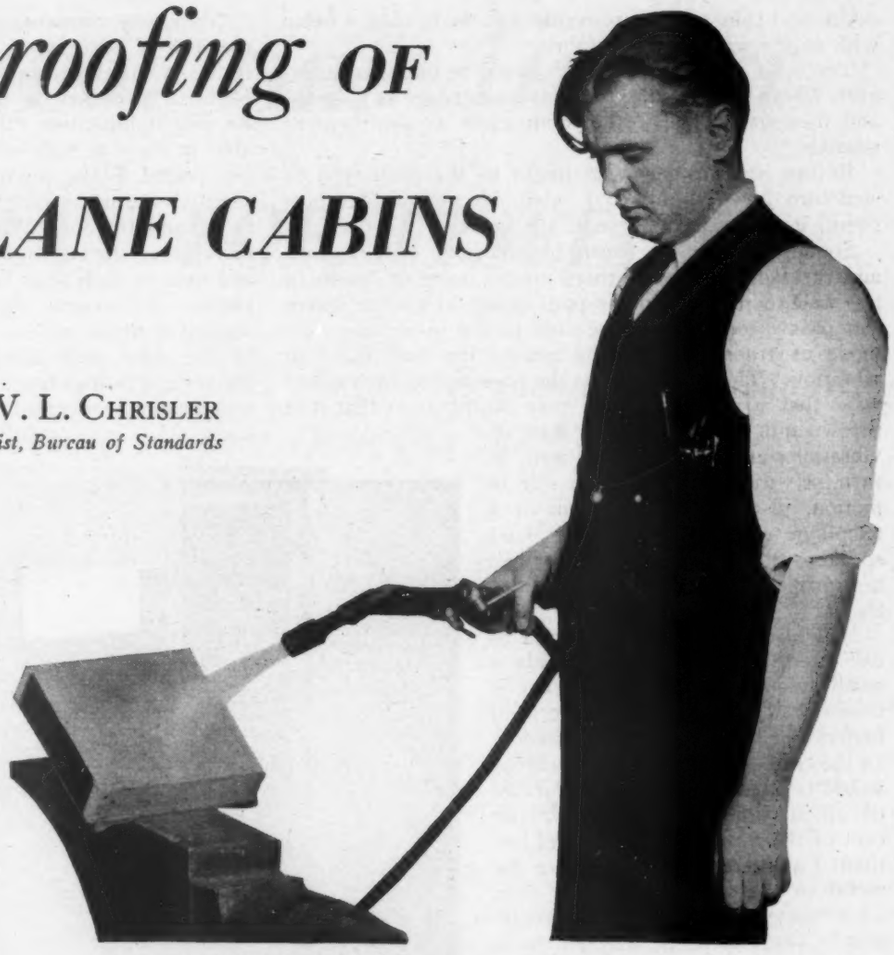
Standardization, since it should never be retroactive, usually lags several years behind its adoption in its universal application in an industry. It also requires whole hearted cooperation, and those entrusted with the policy of an organization and who are designated to represent it at a Standards Conference, should always approach the problem with an open mind, seeking the best general solution, and not merely as salesmen selling their concern's particular small parts, because this might give them the maximum of advantage with the minimum of change disadvantage.

This problem of small engine part standardization is now before the Army-Navy Standards Conference, with the cooperation of the Society of Automotive Engineers assured. The procedure is to make a complete detail analysis of existing designs for a given small engine part, and then on this basis prepare a tentative design which best appears to satisfy the predominating requirements. After this tentative design has been approved by a preliminary conference, it is submitted to the industry in advance of a general Army-Navy Conference to which all commercial engine manufacturers are invited. Here the tentative standard is open to discussion before final adoption.

The success or failure of standardization activity is to a large extent determined by the interest displayed in it by the industry. If the industry feels that the time is not proper for standardization, it will undoubtedly display this by a lack of interest in these proceedings, while if it agrees that it is a worth while and timely undertaking, it will in all probability register its approval by an active and intimate participation.

Soundproofing OF *AIRPLANE CABINS*

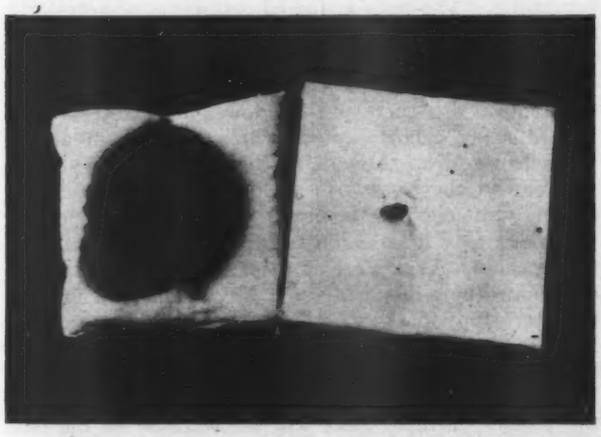
By V. L. CHRISLER
Physicist, Bureau of Standards



Applying blow torch flame to metal covered Dry Zero at Hamilton Company

FROM the standpoint of passenger comfort one of the greatest needs of the present airplane is that the propeller and engine should be made less noisy or that the cabin should be treated in some manner so that the noise shall not be annoyingly loud inside the cabin. At present the passenger often finds he cannot talk with comfort to anyone seated near him and after a ride of two or three hours, hearing is likely to be temporarily impaired.

The Bureau of Standards was requested by the Aeronautics Branch of the Department of Commerce to determine as far as practicable in the laboratory the best method of soundproofing an airplane cabin. A report of this work may be found in Research Paper No. 63 of the Bureau of Standards Journal of Research. The aim of this article is not to repeat the numerical data given in the above report but to discuss some of the general principles involved in preventing the sound from passing into the cabin and building up to a disagreeable intensity.



Condition of Dry Zero after metal was burned through

Tucker [The Problem of Noise in Civil Aircraft and the Possibilities of its Elimination, W. S. Tucker, A.M.I.E.E.; January, 1928] has recently called attention to the fact that if we had an airplane cabin which had no sound absorption on the inside, the intensity of the sound on the inside would build up in time to that outside the cabin no matter how good a sound insulator the cabin walls were. This at first sounds absurd, but he has illustrated it by considering the analagous case of heat transfer. It is well known that if a body is placed in a region of uniform temperature it will finally assume within it the temperature of the surrounding region and that it is impossible to supply sufficient heat insulation to prevent the interior from finally reaching the temperature of the surrounding region.

If we now consider our energy-flow as sound instead of heat it is evident that if there is no loss of sound energy in the cabin (that is, no sound absorption), we must have the same condition as for heat flow; hence the sound intensity inside the cabin will eventually become the same as outside. Fortunately, there is always some absorption in the interior cabin surfaces and the clothing of the passengers adds considerably more, but still more can be done by lining a portion of the inside of the cabin with a very absorbent material. This has been done in some airplanes even when little attempt has been made to prevent the sound from passing into the

cabin, and thus some improvement is made over a cabin with only a wall of doped fabric.

The most satisfactory results would be expected, however, where the walls are made as soundproof as possible, and then the inside of the cabin made as absorbent as possible.

Before we consider what might be the ideal type of structure for a soundproof cabin, let us consider how sound is transmitted through the walls.

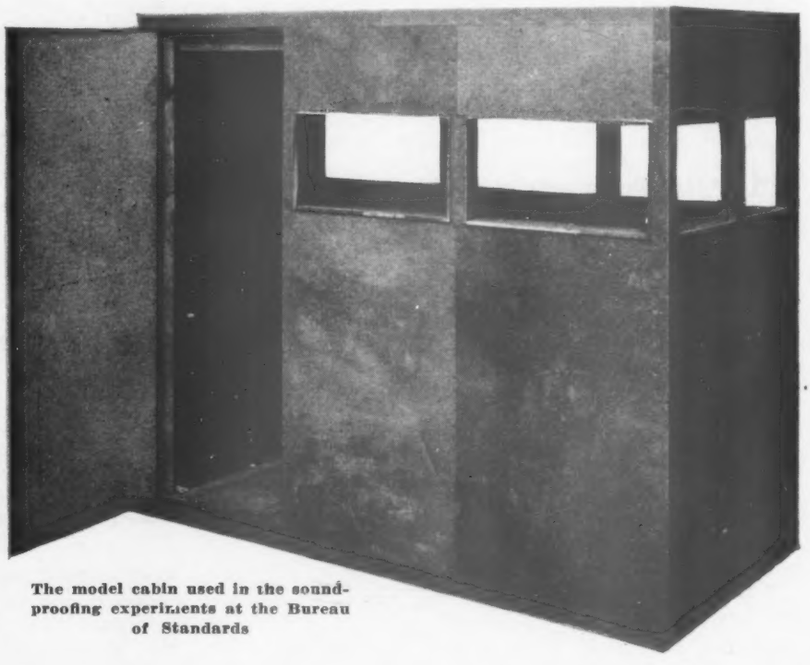
Sound waves in air consist of alternate compressions and rarefactions, and if there are no holes or cracks in the wall to provide an air path along which the waves can pass directly from one side to the other, the only mode of transmission is by setting the wall itself in vibration. The wall yields to the pressure of each sound wave that strikes it (though very slightly), so that it is thrown into a corresponding state of vibration; and the vibrating wall, in turn, sets the air on the other side in motion, just as the diaphragm of a telephone receiver or of a loud speaker sets up sound waves which are propagated through the air to the ear.

It is also desirable at this point to call attention to the fact that only a small amount of the sound energy is transferred from the air to the solid material of the wall at each deflection. In the case of a metal surface such as would be used for the outside surface of an airplane cabin, about 97 per cent of the sound is reflected and less than 3 per cent transferred by the metal to the air on the other side. This being true, the thought immediately suggests itself, why not build a cabin wall which consists of layers separated by air spaces.

Let us consider two walls, one of two layers and one of three layers. If a single layer allows only 0.03 of the sound incident on it to pass through, then the two layer wall might be expected to transmit 0.03 of 0.03 or 0.0009 of the original sound and the three-layer wall 0.03 of 0.0009 or 0.000027 of the original sound. Unfortunately, these thin layers of metal do not act in that way. They are so flexible that the air seems to act as a tie between them and they vibrate together. In one case where measurements were made two layers of metal transmitted as much sound as a single layer.

For such tests it became evident that if two layers were used they should be different in some respect so that they would have different natural periods of vibration and not tend to vibrate together. Also, to help damp out the vibrations and possibly to absorb some of the energy which would be trapped between the two layers, it was found desirable to fill the space between the layers with a highly sound-absorbent material. Several materials such as hair felt, cotton, Balsam Wool and Dry Zero Blanket were tried for this purpose. When about the same thickness of material was used there was not very much difference in the sound transmission although the results were a trifle better for the hair felt. When weight was taken into consideration, however, it was found that by far the best results were obtained with the Dry Zero Blanket.

Numerous combinations of material were tried with the aim of securing a cabin which would be as quiet inside when the plane is in flight as the interior of a Pullman car when the train is in motion. If there were no weight limitation this would be easy, but it is desirable to have a wall which does not weigh more than one pound to the square foot, and some of the manufactures are not willing to exceed six-tenths of a pound to the square foot. What appeared to come the nearest to fulfilling the requirements was a combination of metal and quarter-inch fiber board with Dry Zero Blanket between. To increase the absorption in the cabin it also seemed desirable to line at least a portion of the interior of the cabin with absorbent material. This increased the weight somewhat above the minimum weight that was originally decided upon. It also does not give a method of treatment for the manufacturer who wishes to use fabric for the outside covering. For this reason it has been decided to continue the laboratory work and determine what is the best combination when the outside is fabric.



The model cabin used in the soundproofing experiments at the Bureau of Standards

Co-operative work is under way with several airplane companies. The tests in the laboratory were necessarily made on comparatively small samples and with noises which were radically different from those of an airplane. When built into a plane the results might be somewhat different. Also there are windows, at least one door, and in many cabins heaters which come from around the exhaust pipe. Anyone of these features may materially affect the results. In addition to this the engine is rigidly attached to the frame of the airplane, and the vibrations may be transferred directly along this frame to the cabin. The effect of these features was partially determined by a test made on a Navy plane, but to make a better study of them it was considered desirable to build some of the sound insulation features into various planes and then test them. Different types of planes have been chosen for this purpose and it is hoped that the results of these tests will be available in the near future.

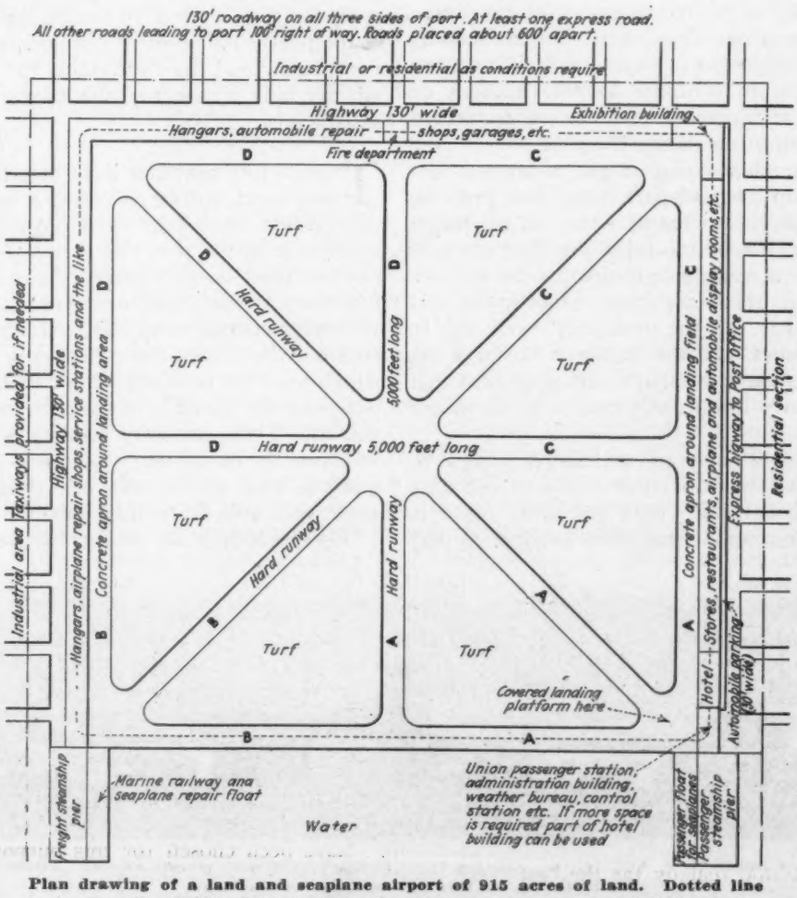
MAKING THE *Airport* PAY FOR ITSELF

The Second of Two Articles on Airport Economics and Conditions Affecting Airport Design in the Future

By J. E. BULLARD and AVERY E. LORD

AIR TRANSPORT COMPANIES and sight-seeing and taxi companies offer the largest potential revenue to the airport. Each of these companies must have hangars, oil, gasoline and supplies. If a rental is derived from the land used for the hangars, if the taxi and sight-seeing companies pay the port a percentage of their revenue and if the transport companies pay a tax on the mail, express, freight and passengers carried a goodly income is assured, provided there are enough of these companies using the port and that they continue to use it.

However, each of these types of companies is likely to be well financed. As a company begins to show a profit, it will find it easier and easier to secure as much money as desired. Therefore, if any of them consider that the charges at the public airport are too high, it is feasible for them to develop their own airports. This means that while all charges made must be high enough to provide an income at least equal to the cost of the service rendered, they must be low enough to make it to the advantage of these companies to use the public port rather than to invest money in their own ports. Since the city does not have to pay the rate of interest on its bond issues that private enterprises must pay on their stocks and other securities in order to attract capital, this seems entirely feasible. However, it requires that the public investment be confined in so far as possible to the land and developing the landing area. In other words to those parts of the port where the return is not too dependent upon efficient and progressive business management.


130' roadway on all three sides of port. At least one express road.
All other roads leading to port 100' right of way. Roads placed about 600' apart.
Industrial or residential as conditions require
Highway 130' wide
Exhibition building
Hangars, automobile repair shops, garages, etc.
Fire department
Turf
Hard runway
5000 feet long
Hard runway 5,000 feet long
Concrete apron around landing field
Hangars, airplane repair shops, service stations and the like
Concrete apron around landing area
Taxiways provided for if needed
Industrial area
Highway 130' wide
Stores, restaurants, airplane and automobile display rooms, etc.
Express highway to Post Office
Residential section
Hotel
Automobile parking (90 wide)
Covered landing platform here
Marine railway and seaplane repair float
Water
Union passenger station, administration building, weather bureau, control station etc. If more space is required part of hotel building can be used
Freight steamship pier
Passenger float for seaplanes
Passenger steamship pier

Plan drawing of a land and seaplane airport of 915 acres of land. Dotted line surrounding field indicates left track subway for passenger and freight cars

Whether or not air transport

companies will continue to use a port under such a system of charges as is levied at Newark (described in the previous aricle) remains to be seen. There is little question that it has one of the very best systems that can be formulated, in principle. The only question is whether or not the rates charged are right. A percentage of the revenue derived by companies using the port for commercial purposes appears to be the only fair way to collect money for the use of the field. In the case of schools, taxi and sight-seeing companies, ten per cent is probably a fair percentage at the present time. Later, when the business of these concerns increases and prices to the public are reduced, it may be necessary for the airport to reduce the percentage it charges them.

IN THE CASE of the air mail the rate paid the companies is fixed to a greater or less degree by the government. There is a maximum the government will pay, and efforts are now being made to reduce the rate materially. Whether or not the companies can pay a cent a pound for each pound of mail going through each port at which planes stop remains to be seen.

The transport companies believe they cannot. Yet the port certainly ought to derive revenue for the use of the field. It would seem that the only way the matter can be settled with satisfaction to all those concerned is through a conference of airport managers and air transport managers.

In such a conference the air transport companies should recognize that the very best port facilities cannot be provided unless the companies furnish an income to the port. Also that there will not be enough ports to extend the air mail as rapidly as desired unless cities can derive a worth-while income from their ports. Just as soon as air transport companies begin to pay good dividends, tax payers are not going to continue to vote millions of dollars for airport development and receive no return from the transport companies using the ports.

Airport managers, while trying to get as large a revenue as possible from the transport companies, must be fair in their demands. The charges levied on the transport companies must not be too high, yet they must be high enough to show a reasonable return for the services and privileges rendered the companies. Since in the past the use of airports has, for the most part, been free to the transport companies, and the transport business has been built up on this basis, coming to an agreement that is fair and satisfactory to all concerned is by no means an easy matter.

Flying schools promise a larger and larger income to the ports having facilities for them. There certainly should be at least one trained pilot for every plane in use. As there are indications that plane production may be expected to double annually for several years, the demand for pilots will require the training of an ever-increasing number of students. As not all students become finished pilots, the number of students enrolled must be materially larger than the number of additional planes that are going into use.

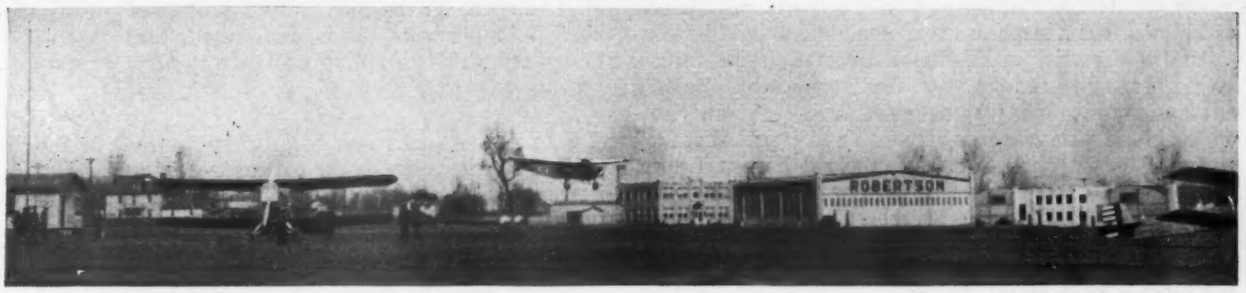
A fully equipped school not only must have planes and hangars but also shops and instruction rooms for the ground school. This means that revenue is derived from land leases in addition to a percentage of the tuitions the schools collect. As the number of students increases the revenue from both these sources becomes much larger for the port. Also as the school becomes larger it is more practical for it to develop its own private port. Therefore, the rates collected from schools need to be low enough to make it less expensive to use the public port than to operate a private port.

With so many oil companies only too glad to get concessions at airports, it is not likely that even the smaller ports will find it necessary to sell gas and oil themselves. With gas, oil and grease sold by private companies the port management is relieved of many business details. All that it has to do is to collect the tax per gallon that has been agreed upon. The net result is almost certain to be lower operating costs at the port and greater revenue.

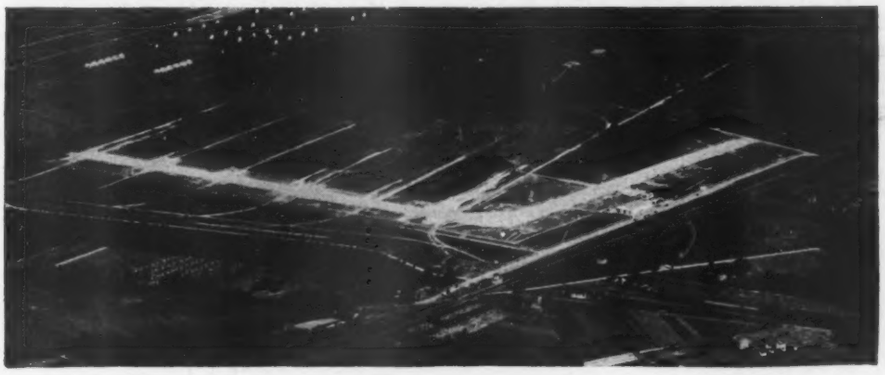
There are two general ways in which the amount collected for each gallon of oil and gasoline sold can be determined. One is to ask bids from the oil companies, each company putting in a bid to pay what it considers it can afford on each gallon of gas and oil sold, and guaranteeing a specified minimum revenue per year to the port, for the privilege of selling gasoline, oil and grease at the port. This proves a satisfactory method when the port is new and the city retains the power to turn down all the bids if the revenue they offer does not seem satisfactory.

THE OTHER METHOD is to determine in advance just how much will be collected on each gallon of gas and oil. Where more than one oil company is to be given a concession at the port this seems the fairest way. Two to three cents on each gallon of gasoline sold and three to five cents on each gallon of oil certainly seems fair. As revenue increases from this source it may be well to discontinue the oil tax and collect only on the gasoline, thus simplifying the bookkeeping, or a higher tax may be collected on the gasoline at the start and none collected on the oil. There are very good reasons to believe that it will not be many years before a two-cent tax on all gasoline sold at the port will yield a revenue at some ports that will more than pay the operating expenses. [This should logically replace the state gasoline tax, since

A section of Asa Candler Field, Atlanta, Ga., showing three hangars built with private capital. Pilots consider this field to be one of the best equipped in the South



Above: A view of one side of the Lambert-St. Louis airport showing the buildings of the Curtiss-Robertson Company. A sufficient area of land should be set aside at every airport to provide for industrial growth linked with the aeronautical industry. Below: An air view of the 1,300 acre site, part of which is to be developed as an airport at Richmond, Va. Arrangements have been made so that the city can obtain 500 acres if desired



the aircraft derive no benefit from the highways, to which the proceeds of the state tax are devoted.—Ed.]

Should there be cases where satisfactory arrangements cannot be made with an oil company, it is always possible to establish a revolving fund as has been done in Buffalo. This, however, means more work for the management and does not always bring in the net income that has been expected.

The trend at municipal airports is away from municipal hangars and toward private hangars. If private capital can be found to build all the hangars required, paying a land rental on the land used, the city is almost certain to secure a larger net revenue than it will if it builds and operates hangars of its own. The simpler the management problems can be made the better.

Aviation has reached a stage where it seems no more necessary nor no more desirable for the city to build public hangars than to build public garages. This was not the case two or three years ago, when there were fewer planes in use. There were perfectly good reasons why the cities that were pioneers in developing airports should erect hangars. Those reasons no longer exist. Good reasons why the city should not go into hangar building, if it wants its airport to pay for itself, do exist. The main reason is that when the city starts in competition with those who lease land for the purpose of erecting public hangars or hangars for their own use but from which they hope to derive a little extra revenue by renting space, there are almost certain to be charges of unfair competition with conditions arising which tend to reduce the revenue the port should be deriving.

Though the city should not build any hangars if private capital can be persuaded to do the building, there are two types of buildings which it may be necessary for the city to build. One of these is the passenger terminal building. The other is an exhibition hall.

A terminal building is absolutely essential for passenger business. All the planes of all the lines using the port should discharge and take on passengers under cover at this terminal building. It should serve the same purpose in air transportation that a union station serves in railroad transportation.

If the air transport companies can be prevailed upon to organize a terminal building company with provisions in the charter making it obligatory to take in, and give a place on the directorate, to any new company the city allows to use the port, this will usually prove to be the most satisfactory solution. If its erection by private capital is going to bar from it all transport companies except those who took part in erecting it, it is better that the city erect the terminal building itself.

In case the city builds the structure it should make charges for its use to every company using it. The offices of the airport manager and his staff, the control room, the radio room, the weather bureau office and the like should all be housed in this building.

WHETHER the city builds the building itself or not, a revenue should be derived from it. If built by private capital there is the land rent that can be collected. If the city builds it, rentals should be charged that will result in a total equal to the land rental, plus a sum that will cover all operating expenses of the building, interest on the investment, depreciation and the like. In other words the building should show a net revenue to the city.

In such a building there are restaurant, check room, cab and bus offices, store and other concessions that can be leased, and if a separate hotel building is not erected some hotel accommodations can be incorporated in the same building. Either private capital or the city should be able to make a profit on the building after business develops at the port to the degree it is reasonable to believe it should. Of course in determining the rental and concession charges estimates should be made over a period of five or ten years so that the initial charges will not be prohibitive and keep business away, rather than attract it.

The exhibition building is new to airports, with a few exceptions, but a structure that undoubtedly will be considered a necessity at all major airports in the future. It is primarily needed for the purpose of holding airplane shows, and just as most cities hold an automobile show each year it is reasonable to expect that they will also hold airplane shows in the not distant future. It may well be built next to the terminal building with an entrance for airplanes from the landing field and for the public from the street. With planes increasing in size it is no longer practical to hold shows at which are exhibited planes of all the sizes and types being built unless an exhibition hall is provided at the port.

In addition to airplane shows these halls provide excellent facilities for automobile shows, conventions, athletic events, various kinds of exhibitions and for other purposes. If the building is erected by a private company, that company is likely to find it a good investment. If the city erects it and leases it to a private company the problem of deriving a revenue from it is solved. If the city erects it and undertakes the management of the building the revenue derived is likely to be less than hoped for, because keeping it in use requires an intensity of salesmanship and an ingenuity that is of an entirely different type from that required by a successful airport manager.

PLACE THE BUILDING under expert management, preferably under the management of a well-financed private company that has the money available to do the advertising, conduct the publicity and do the other promotional work necessary to attract a steady series of events, and it can be made a good source of indirect revenue though the direct revenue from it may not be large. Every event will attract both motorists and flyers, and from these a revenue can be derived through sales and parking space. The port will become better and better known and business at it will increase. Therefore, the exhibition building even in a relatively small community need not become a white elephant.

A source of revenue, not given much attention in the past but which, especially if an exhibition building is erected, promises much for the future is automobile parking. On a Sunday at Steinberg Airport, St. Louis, $800 was made taking passengers on short flights and $12,000 taken in for parking automobiles.

More and more automobile parking space will be required at all airports and the city about to develop a new port should give this source of revenue careful attention and reserve ample areas of ground. Not only is outdoor parking space necessary but indoor parking space is also desirable. People who drive to the port to take an air trip of a day or so do not want to leave their cars out of doors. If there is a garage at the port, they can park in this building. If this garage is equipped for all kinds of repairing, washing, painting and the like, the car owner can have any needed work done on his car while he is away. This is a convenience that is likely to become popular, especially because most airports are so far away from the centers of the cities they serve.

At Sky Harbor near Chicago, a feature is the club house with its roof garden where the best of food is served, the highest class of entertainment provided, and the patrons given an opportunity to watch what is taking place on the flying field while they are eating. Some such building would seem to be a good source of revenue at every airport. If the Sky Harbor project proves as successful in operation as is anticipated, here is another undertaking that can be turned over to private capital at the city airport.

WHERE SCHOOLS ARE CONDUCTED, in view of the increasing desire on the part of women to learn to fly, it would seem wise for either the city or the school to provide a women's club house for the co-eds of the flying schools. If there are not enough of these co-eds then it can be made a club house for all women and perhaps the women's clubs in the city can get together, raise the money to erect the building and organize a women's flying club with dues that will pay for the upkeep of the building and the land rental.

Usually, after all the buildings enumerated have been erected there is still vacant space around the margin of the field that must be fenced in. Fences cost money. A good way to make the fence pay for itself is to erect grandstands or bleechers where it is practical to do so. The entrance to these should be from outside the field and barriers of sufficient height and strength built in front of them to prevent people from crowding onto the field when anything especially exciting is taking place. These stands can be erected in the sizes, at the places and when they are needed. Later when the space is needed for permanent structures they can be moved to new locations or perhaps placed on the roofs of the buildings. The revenue derived from selling seats in these stands depends of course upon what takes place at the port, but it ought to be possible at any port to make the revenue worth while.

Privately owned planes have not become sufficiently numerous in most parts of the country to provide much revenue to the airport. Their number, however, is steadily growing and within a few years they should be an important source of revenue. The trend in regard to these planes appears to be to charge a landing fee of a dollar if nothing is spent at the port, but to waive the charge if oil, gasoline, or hangar space is bought. In other words there is a minimum that must be paid if money is spent in no other way at the port. It is likely, however, that the landing fee will be abolished altogether but that no plane will be permitted to be parked except in a hangar, thus keeping the landing field entirely free of planes that are not landing, taking off, or being serviced with oil and gas and providing business for the hangar owners that will require the building of more and more hangars.

There is one type of private plane owner, however, that has to be barred from public air ports. He is the person who uses his plane for the purpose of carrying passengers on short flights from any place where he can find a field and good business. If he is permitted to use the public port he uses it only when business is rushing, and when things get a little slack he flies on to some other place where he can get business. It is not fair to those who have money invested in buildings at the port to permit such a plane owner to visit the port and use it for commercial purposes. He has to be restricted to merely landing and taking off, buying gas and oil and the like, and in some cases it may be wise to bar him from even these privileges. It depends much upon whether he is using the facilities for the purpose of competing with those who are established at the port. Every protection within reason has to be given to those from whom the port is deriving a steady income.

A STATISTICAL PICTURE OF THE *Air Mail*

An Analysis of Recent Operations in the United States

THE STORY of the domestic air mail in this country commands interest even when told through the supposedly formidable medium of statistics. In fact, the picture thus may be seen with greater detail and at the same time with broader perspective than other presentations afford. The financial standing of the air mail at the present time deserves particularly close attention because of the tremendously important air mail rate hearings which have been going on for some months between the Post Office Department and the contracting companies. Public as well as professional interest has been drawn to the air mail situation by these conferences and, as air mail is one of the most vital departments of the country's aeronautical structure, those inside the industry are particularly alert to the events at Washington. The outcome is likely to mark a new era in the country's air mail history.

To present the record of the mail services clearly and to indicate the important trends therein, the accompanying table and charts have been prepared from reports issued monthly by the Post Office Department for 1927, 1928 and through August 31, 1929. Figures for 1926 and the complete monthly figures for 1927 were not available. The survey therefore uses the 1927 totals for a starting

			Total for Year 1927				
			Mi.	Lbs.		— Revenue —	
Cam	Route	Operator	Flown	Carried	Compensation	per Mi.	per Lb
1.	Boston–New York	Colonial	97,769	20,186	$60,560	$0.619	$3.00
2.	Chicago–St. Louis	Universal	138,178	34,794	88,255	.639	2.53
3.	Chicago–Dallas (e)	National	674,621	109,789	329,366	.488	3.00
4.	Salt Lake City–Los Angeles	Western	421,045	203,224	609,670	1.448	3.00
5.	Salt Lake City–Pasco	Varney	318,758	59,972	179,918	.564	3.00
6.	Detroit–Cleveland	Stout	52,418	1,724	1,862	.036	1.08
7.	Detroit–Chicago	Stout	132,180	12,291	13,251	.091	1.08
8.	Seattle–Los Angeles (a) (h)	Pacific	609,103	115,086	216,048	.355	2.81
9.	Chicago–Minneapolis (j)	Northwest	180,213	27,647	76,029	.42	2.75
11.	Cleveland–Pittsburgh	Ball	59,440	19,573	58,719	.989	3.00
12.	Cheyenne–Pueblo (g)	Western	140,217	36,193	103,032	.735	.83
16.	Cleveland–Louisville	Universal	.....	.....	.....	.....	.....
17.	New York–Chicago (b)	National	301,156	172,851	205,861	.684	1.185
18.	Chicago–San Francisco (d)	Boeing	688,558	286,712	608,279	.883	2.11
19.	New York–Atlanta (i)	Pitcairn	.....	.....	.....	.....	.....
20.	Buffalo–Cleveland	Colonial Wes'n	3,052	329	365	.12	1.11
21.	Dallas–Galveston	Southern A. T.	.....	.....	.....	.....	.....
22.	Dallas–San Antonio	Southern A.T.	.....	.....	.....	.....	.....
23.	Atlanta–New Orleans	Southern A. T.	.....	.....	.....	.....	.....
24.	Chicago–Cincinnati	Embry-Riddle	6,516	1,043	1,533	.25	1.47
25.	Atlanta–Miami	Pitcairn	.....	.....	.....	.....	.....
26.	Great Falls–Salt Lake City	Nat'l Parks	.....	.....	.....	.....	.....
27.	Bay City–Chicago (f) (n)	Thompson	.....	.....	.....	.....	.....
28.	St. Louis–Omaha	Universal	.....	.....	.....	.....	.....
29.	New Orleans–Houston (m)	Southern A. T.	.....	.....	.....	.....	.....
30.	Chicago–Evansville (e) (k)	Interstate	.....	.....	.....	.....	.....
31.	Chicago Municipal Port–Grant Park Ramp (o)	Curtiss	.....	.....	.....	.....	.....
	Total		3,823,214	1,101,414	$2,552,755	$0.667	$2.32

(a) Southbound trip not operated from Seattle to Portland.
(b) Service on Detroit–Toledo spur inaugurated June 4, 1928.
(c) Service on Tulsa–Ponca City spur inaugurated July 5, 1928.
(d) Chicago-Lincoln line inaugurated July 10, 1928.
(e) Service Inaugurated Nov. 19, 1928.
(f) Flint & Pontiac, Mich., included on route Nov. 27, 1928.
(g) Additional service between Cleveland & Akron started Nov. 15, 1928.
(h) San Jose, Calif., Service inaugurated Oct. 15, 1928.
(i) New York–Philadelphia service included Oct. 1, 1928.
(j) Milwaukee–Green Bay extension inaugurated Dec. 15, 1928
(k) St. Louis–Evansville & Evansville–Atlanta service inaugurated Dec. 1, 1928.
(m) Service effective May 1, 1928.
(n) Service from Bay City to Cleveland inaugurated April 1, 1929.
(o) Service effective June 15, 1929.
Route 19 established May 1, 1928.
Route 23 established May 1, 1928.
Route 26 established June 30, 1928.
Route 6 discontinued July 10, 1928.
Route 7 discontinued July 16, 1928.
Route 27 established July 10, 1928.
Route 25 inaugurated Dec. 1, 1928.

point. The first three sections of the table present the totals for 1927, 1928 and 1929 and the rest of the table presents the record by quarters. The tabulations show miles flown, pounds of mail carried, amount of compensation, revenue per mile and, in the case of the yearly totals, the revenue per pound for companies. The two charts show the curves for seven representative companies in regard to variation of compensation per mile flown and variation of pounds carried per schedule trip.

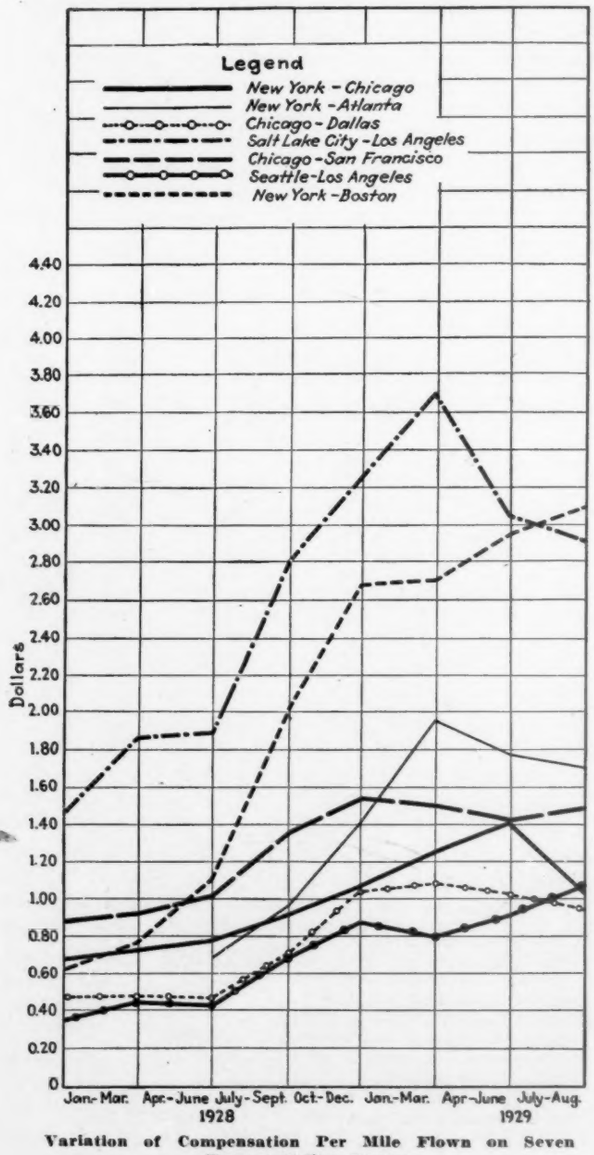
Since the method, or rate, of paying the contractors in the future is the main issue in the Washington hearings, the revenue aspects of these statistics assume particular importance.

Divergences in the amount of compensation among the various contractors are easily traced in the accompanying table an dcharts and it is obvious that the older, pioneer operators are receiving higher rates of pay than the more recent ones.

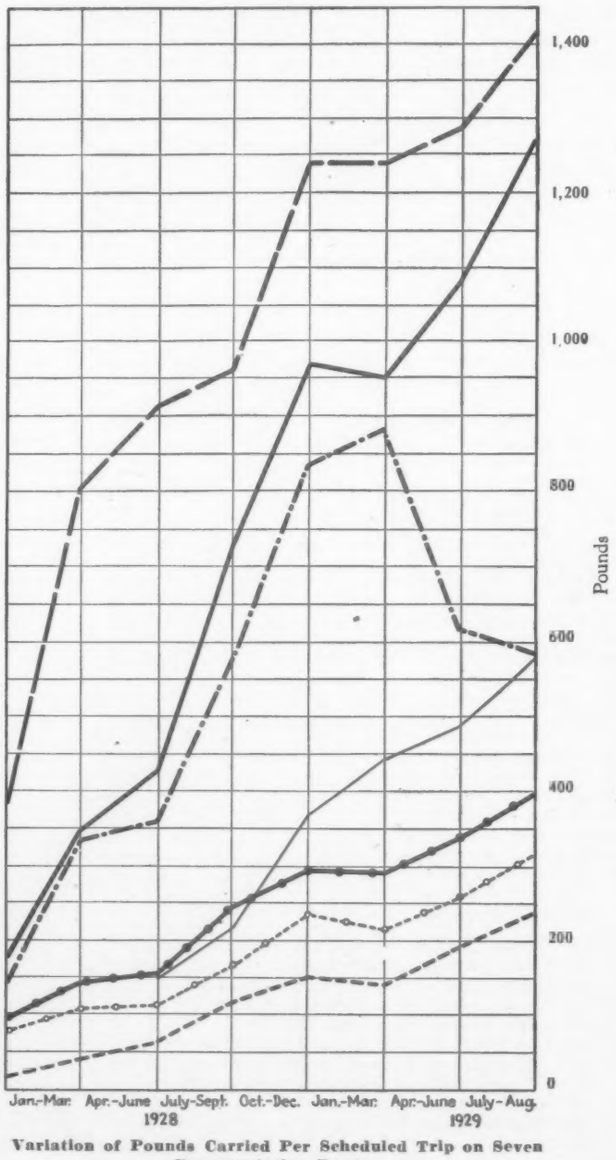
This downward trend is to the liking of the government, of course, and the authorities apparently contend that some of the pioneers now should scale down their compensation to something comparable to what the more recent arrivals in the air mail field are receiving. There obviously is some inconsistency at present.

The total number of miles flown in 1927 was 3,823,214. During 1928 two and a half times as many miles were flown. Using the mileage figure through August 31 as representing two thirds of what the total will be for this year, we find that about 12,350,201 mi. will be flown in 1929, an increase of about one third over the 1928 total. Eight new routes were added during 1928 and so far this year there have been but three additions (one being the shuttle service between Chicago Municipal Airport and Grant Park) and two cancellations (the mail services on the Stout lines).

Poundage has jumped ahead somewhat faster. During 1928 the poundage carried was a little more than three times as large as in 1927. Again assuming the figure through August 31, 1929, as representing two thirds of the probable total for this year, we get a total theoretical poundage for 1929 of 6,735,435—a figure not quite double that for 1928. With the help of the usual Christmas boom in traffic, this theoretical figure probably will be found a bit conservative. It should be borne in



Variation of Compensation Per Mile Flown on Seven Representative Routes



Variation of Pounds Carried Per Scheduled Trip on Seven Representative Routes

Cam	Route	Total for Year 1928 Mi. Flown	Lbs. Carried	Compensation	Revenue per Mi.	Revenue per Lb.	Total for Year 1929 (to Aug. 31, 1929) Mi. Flown	Lbs. Carried	Compensation	Revenue per Mi.	Revenue per Lb.
1.	Boston–New York	99,543	55,743	$166,966	$1.678	$3.00	78,273	76,003	$227,962	$2.91	$3.00
2.	Chicago–St. Louis	147,661	63,489	160,702	1.09	2.535	200,463	55,980	141,701	.702	2.54
3.	Chicago–Dallas	982,504	226,036	678,093	.68	3.00	721,736	248,901	746,673	1.025	3.00
4.	Salt Lake City–Los Angeles	457,662	385,925	1,156,654	2.53	3.00	441,017	469,733	1,409,120	3.195	3.00
5.	Salt Lake City–Pasco	370,043	133,367	400,032	1.083	3.00	241,371	136,883	410,049	1.70	3.00
6.	Detroit–Cleveland	26,598	1,170	1,259	.047	1.07	.....	.....	.....	.....	.....
7.	Detroit–Chicago	71,348	9,758	10,499	.147	1.08	.....	.....	.....	.....	.....
8.	Seattle–Los Angeles	631,924	137,664	389,740	.616	2.83	507,059	163,952	464,231	9.15	2.85
9.	Chicago–Minneapolis	241,190	71,070	195,524	.81	2.75	433,551	110,373	303,475	.70	2.75
11.	Cleveland–Pittsburgh	89,256	66,817	203,452	2.275	3.00	86,749	64,004	191,985	2.21	3.00
12.	Cheyenne–Pueblo	143,842	62,817	52,138	.36	.83	104,254	65,414	54,293	.52	.83
16.	Cleveland–Louisville	101,706	28,285	34,506	.339	1.21	229,673	67,118	81,832	.356	1.22
17.	New York–Chicago	1,047,537	908,441	910,537	.87	1.00	808,592	1,055,288	884,473	1.093	.836
18.	Chicago–San Francisco	1,623,802	986,164	2,016,495	1.25	2.02	1,585,430	1,130,307	2,312,242	1.455	2.04
19.	New York–Atlanta	301,770	106,630	319,890	1.058	3.00	362,060	217,215	651,651	1.80	3.00
20.	Buffalo–Cleveland	179,554	52,988	58,815	.327	1.11	201,198	67,769	75,208	.372	1.11
21.	Dallas–Galveston	199,558	29,195	84,433	.42	2.89	153,880	31,765	91,799	.597	2.89
22.	Dallas–San Antonio	209,154	42,842	123,770	.58	2.89	237,983	54,674	157,965	.662	2.89
23.	Atlanta–New Orleans	194,412	27,677	48,432	.249	1.75	210,509	56,801	99,174	.47	1.75
24.	Chicago–Cincinnati	179,249	41,098	60,401	.337	1.47	187,239	50,999	74,938	.40	1.47
25.	Atlanta–Miami	33,289	4,841	6,993	.21	1.44	292,569	76,905	112,281	.384	1.46
26.	Great Falls–Salt Lake City	145,068	23,876	59,094	.407	2.475	256,057	44,812	110,881	.432	2.47
27.	Bay City–Chicago	151,652	70,166	62,447	.412	.89	316,681	117,590	104,656	.330	.89
28.	St. Louis–Omaha	.....	.....	.....	.....	.....	95,628	19,263	15,121	.158	.785
29.	New Orelans–Houston	.....	.....	.....	.....	.....	126,994	26,831	26,831	2.12	1.00
30.	Chicago–Evansville	45,464	8,850	6,900	.154	.78	353,900	67,346	52,530	.148	.78
31.	Chicago Municipal Port–Grant Park Ramp	.....	.....	.....	.....	.....	621	14,734	1,020	1.641	.69
	Total	9,673,786	3,544,909	$7,207,783	$0.745	$2.033	8,233,467	4,490,290	$8,802,103	$1.07	$1.96

Cam	Route	January 1, 1928—March 31, 1928 Miles Flown	Lbs. Carried	Compensation	Revenue per Mile	April 1, 1928—June 30, 1928 Miles Flown	Lbs. Carried	Compensation	Revenue per Mile
1.	Boston–New York	23,812	6,063	$18,157.31	$0.76	23,901	8,801	$26,402.81	$1.104
2.	Chicago–St. Louis	35,234	12,336	31,226.28	.89	35,306	9,311	23,567.91	.667
3.	Chicago–Dallas	201,266	32,376	97,115.17	.483	251,463	40,242	120,727.31	.477
4.	Salt Lake City–Los Angeles	98,384	60,835	182,503.77	1.86	103,708	65,047	195,140.43	1.885
5.	Salt Lake City–Pasco	81,374	17,797	53,389.12	.66	95,304	21,828	65,475.55	.686
6.	Detroit–Cleveland	12,831	377	406.68	.032	12,019	702	756.74	.063
7.	Detroit–Chicago	32,572	4,482	4,801.32	.147	33,088	4,596	4,963.57	.15
8.	Seattle–Los Angeles	140,783	22,286	62,963.23	.447	162,307	24,473	69,274.32	.432
9.	Chicago–Minneapolis	47,046	9,256	25,452.28	.54	48,018	10,968	30,161.74	.626
11.	Cleveland–Pittsburgh	20,318	9,573	28,720.78	1.39	21,648	11,620	34,857.19	1.606
12.	Cheyenne–Pueblo	34,412	9,078	7,535.36	.218	35,757	11,185	9,283.86	.26
16.	Cleveland–Louisville	.....	.....	.....	.....	.....	.....	.....	.....
17.	New York–Chicago	222,371	125,625	150,193.46	.738	239,985	156,426	182,353.98	.76
18.	Chicago–San Francisco	331,965	146,908	303,466.53	.914	349,898	166,901	352,050.01	1.01
19.	New York–Atlanta	.....	.....	.....	.....	71,670	15,817	47,430.99	.662
20.	Buffalo–Cleveland	24,521	2,597	2,881.69	.175	37,630	6,214	6,897.89	.183
21.	Dallas–Galveston	28,256	3,573	10,327.59	.36	56,356	7,108	20,545.90	.365
22.	Dallas–San Antonio	27,919	4,815	13,871.73	.497	51,405	7,839	22,655.70	.441
23.	Atlanta–New Orleans	.....	.....	.....	.....	49,455	5,734	10,033.62	.203
24.	Chicago–Cincinnati	41,591	5,057	7,435.21	.178	45,666	6,887	10,123.44	.222
25.	Atlanta–Miami	.....	.....	.....	.....	.....	.....	.....	.....
26.	Great Falls–Salt Lake City	.....	.....	.....	.....	493	5	12.37	.025
27.	Bay City–Chicago	.....	.....	.....	.....	.....	.....	.....	.....
28.	St. Louis–Omaha	.....	.....	.....	.....	.....	.....	.....	.....
29.	New Orleans–Houston	.....	.....	.....	.....	.....	.....	.....	.....
30.	Chicago–Evansville	.....	.....	.....	.....	.....	.....	.....	.....
31.	Chicago Municipal Port–Grant Park Ramp	.....	.....	.....	.....	.....	.....	.....	.....
	Total	1,404,655	473,024	$1,000,447.51	$0.712	1,724,377	581,704	$1,232,735.33	$0.705

mind in all discussion of poundage that the compilation includes the mail carried by several companies over connecting routes and the same mail is credited to each company which handles it.

The volume of compensation has, of course, increased with the changes in poundage since the payments are made on the poundage basis. However, the total compensation in 1928 was not quite three times that paid in 1927, as compared to the larger increase for the poundage in the same period. Again obtaining a theoretical total for this year from the amount paid through August 31, we find that we may expect a sum not quite double that paid during 1928. The increases in both poundage and payments this year seem to be in the same proportion. It is interesting to note that in both items, the figures through August already have surpassed by substantial margins the year's totals for 1928.

The average revenue per mile flown has increased each year while the average revenue per pound of mail carried has decreased. This seems paradoxical at first glance but the ratio of the two is, of course, the ratio of the average weight carried on each trip to the average length of "stage" and may therefore fluctuate in any fashion. The average revenue per mile in 1928 was $.08 greater than in 1927 and through August of this year the figure already has increased $.33. This is

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because the volume of mail and the compensation have increased more rapidly than the miles flown.

The average revenue per pound went down $.29 in 1928 and another $.07 through August of this year. This is due to two causes: First the slight variations involved in the sliding scale of payment under which three of the routes (New York-Chicago, Chicago-San Francisco and Seattle-Los Angeles) are operated while the others remain constant, and, second, the aforementioned fact that the newer contracts involve smaller rates of pay than the older ones. These two influences have a direct effect on this downward trend of the compensation earned by each pound of mail.

So much for the yearly total tables. The quarterly totals contain further interesting data, showing as they do the steady increase in the three items of mileage flown, poundage carried and compensation paid. While individual companies during these quarters were having their ups and downs, the average for the whole constituted a distinct upward trend. Conspicuous in these quarterly trends is the leap upward recorded in the third quarter of last year when the new low mail rate went into effect. Compared to the preceding quarter, the miles flown increased by less than a third, but poundage by more than four fifths and compensation by more than two thirds.

Taking the months of July and August of this year as representing two thirds of that quarter, we may derive theoretical totals for that quarter as follows: Mileage, 3,853,749; poundage, 2,020,786; and compensation, $3,913,530. This indicates that the upward trend of the preceding periods continued through this one and that the growth of the air mail has by no means been checked by any unfavorable influences. It represents a tremendous gain over the same period the year before when the low mail rate became effective.

It might be well to state here that this general upward trend shown by the figures in quarterly form does not hold in the monthly reports (not shown here). For instance, there was a drop in February from the total poundage reported for January. In March it went up and in April dropped back again. Through May, June, July and August there was an increase each month over the preceding month. In 1928, the poundage increased through January, February and March. It dropped in April, soared in May and continued through June and July to the big month of August.

Revenue per mile increased in each quarter through 1928 but fell off during the first two quarters of this year. This was because the mileage increased at a greater rate than the poundage although the mileage, poundage and compensation did continue to increase. The opposite condition obtained during 1928 when the poundage increased much faster than the mileage flown. This figure in the yearly total for 1929 (through August) shows a gain over 1928 because the quarterly decrease has not been as low as most of the quarterly figures obtaining last year.

There seems to be little indication of seasonal weather influences on these quarterly totals. There apparently was a slowing up during the first quarter of this year, the worst of the winter period, since the increases were not as large as had been made in the preceding periods. The stride was picked up again in the second and third quarters, however.

Narrowing our analysis down to the records of individual companies, we discover considerable variation from the general trend of the companies taken as a group. Although the upward movement in matters of mileage, poundage and compensation have progressed steadily for the companies as a whole, a few individuals have been having their troubles. It is unnecessary to point out all these trends here as the table shows them without need of further comment. However, a study of what happened in the winter season of 1928-1929 holds interest because of the seasonal and holiday factors involved.

The fourth quarter of 1928 was the peak for all the companies for that year and most of the operators had experienced a steady increase throughout the year. During the first quarter of this year however, the picture was changed and twelve companies flew less

		July 1, 1928—September 30, 1928				October 1, 1928—December 31, 1928			
Cam	Route	Miles Flown	Lbs. Carried	Compensation	Revenue per Mile	Miles Flown	Lbs. Carried	Compensation	Revenue per Mile
1.	Boston–New York	25,454	17,452	$52,353.36	$2.03	26,376	23,437	$70,053.36	$2.678
2.	Chicago–St. Louis	35,306	19,383	49,060.36	1.38	41,815	22,459	56,848.08	1.358
3.	Chicago–Dallas	280,993	67,017	201,050.06	.716	248,782	86,401	259,200.75	1.041
4.	Salt Lake City–Los Angeles	113,685	106,309	318,928.50	2.803	141,885	153,734	460,081.58	3.246
5.	Salt Lake City–Pasco	97,400	39,433	118,298.62	1.225	95,965	54,309	162,868.87	1.695
6.	Detroit–Cleveland	1,748	91	96.21	.055	.....	.....	.....	.....
7.	Detroit–Chicago	5,688	680	734.74	.129	.....	.....	.....	.....
8.	Seattle–Los Angeles	161,322	39,386	111,712.22	.691	167,412	51,519	145,790.50	.87.
9.	Chicago–Minneapolis	49,708	19,225	52,868.75	1.063	96,418	31,621	87,041.28	.905
11.	Cleveland–Pittsburgh	22,637	14,229	42,688.12	1.882	24,653	31,395	97,186.12	3.916
12.	Cheyenne–Pueblo	36,713	20,428	16,955.14	.462	36,960	22,126	18,364.58	.498
16.	Cleveland–Louisville	41,424	9,328	11,379.93	.275	60,282	18,957	23,126.48	.385
17.	New York–Chicago	289,250	268,742	264,784.24	.915	295,931	357,648	313,205.60	1.06
18.	Chicago–San Francisco	441,530	289,384	594,787.96	1.348	501,209	382,971	766,191.31	1.53
19.	New York–Atlanta	105,924	33,170	99,510.18	.94	124,176	57,643	172,929.75	1.415
20.	Buffalo–Cleveland	63,198	18,446	20,474.64	.324	54,205	25,731	28,560.78	.526
21.	Dallas–Galveston	58,040	7,941	22,948.28	.394	56,906	10,573	30,611.79	.55
22.	Dallas–San Antonio	51,584	10,800	31,212.54	.606	78,246	19,388	56,030.24	.715
23.	Atlanta–New Orleans	72,634	9,003	15,754.26	.217	72,323	12,940	22,644.89	.31
24.	Chicago–Cincinnati	48,000	13,709	20,138.23	.42	43,992	15,445	22,704.54	.516
25.	Atlanta–Miami	.....	.....	.....	.....	33,289	4,841	6,993.95	2.10
26.	Great Falls–Salt Lake City	58,796	10,255	25,381.97	.432	85,779	13,616	33,700.06	.393
27.	Bay City–Chicago	73,719	43,046	38,310.90	.52	77,933	27,120	24,136.37	.31
28.	St. Louis–Omaha	.....	.....	.....	.....	.....	.....	.....	.....
29.	New Orleans–Houston	.....	.....	.....	.....	.....	.....	.....	.....
30.	Chicago–Evansville	.....	.....	.....	.....	45,464	8,850	6,900.28	.15
31.	Chicago–Municipal Port-Grant Park Ramp	.....	.....	.....	.....	.....	.....	.....	.....
	Total	2,134,753	1,057,457	$2,109,429.21	$0.99	2,410,001	1,432,724	$2,865,171.16	$1.188

Cam	Route	January 1, 1929—March 31, 1929 Miles Flown	Lbs. Carried	Compensation	Revenue per Mile	April 1, 1929—June 30, 1929 Miles Flown	Lbs. Carried	Compensation	Revenue per Mile
1.	Boston–New York	23,721	21,264	$63,792.56	$2.692	30,250	29,662	$88,937.31	$2.95
2.	Chicago–St. Louis	47,139	19,050	48,222.45	1.021	84,102	21,099	53,407.00	.635
3.	Chicago–Dallas	215,169	77,729	233,185.97	1.083	256,212	92,624	277,845.12	1.046
4.	Salt Lake City–Los Angeles	129,291	158,976	476,850.18	3.70	173,126	176,183	528,547.50	3.05
5.	Salt Lake City–Pasco	80,248	46,683	139,447.17	1.73	95,403	51,710	155,131.87	1.615
6.	Detroit–Cleveland	.....	.....	.....	.....	.....	.....	.....	.....
7.	Detroit–Chicago	.....	.....	.....	.....	.....	.....	.....	.....
8.	Seattle–Los Angeles	185,206	52,653	148,782.61	.805	190,213	62,199	176,244.39	.921
9.	Chicago–Minneapolis	144,866	31,093	85,504.03	.59	154,710	34,517	94,874.50	.612
11.	Cleveland–Pittsburgh	23,794	27,533	82,598.25	3.47	33,405	24,012	72,012.31	2.15
12.	Cheyenne–Pueblo	39,640	21,510	17,853.09	.45	37,600	24,023	19,938.98	.53
16.	Cleveland–Louisville	56,645	19,211	23,436.05	.415	84,920	26,197	31,910.57	.375
17.	New York–Chicago	254,888	343,276	302,115.76	1.26	307,763	394,028	330,942.46	1.401
18.	Chicago–San Francisco	504,456	374,722	755,668.05	1.50	623,268	428,774	877,076.38	1.41
19.	New York–Atlanta	102,320	66,444	199,337.23	1.94	143,996	84,689	254,068.68	1.77
20.	Buffalo–Cleveland	52,244	23,755	26,358.43	.50	82,058	25,568	28,381.25	.345
21.	Dallas–Galveston	55,224	11,142	32,199.66	.582	58,352	13,409	38,749.30	.665
22.	Dallas–San Antonio	79,286	18,967	54,771.38	.69	94,171	21,394	61,829.02	.654
23.	Atlanta–New Orleans	62,554	14,904	26,082.54	.415	87,767	25,540	44,696.30	.51
24.	Chicago–Cincinnati	44,065	18,968	27,882.41	.63	48,068	16,601	24,380.64	.50
25.	Atlanta–Miami	97,282	31,937	46,628.67	.48	112,331	26,545	38,755.79	.345
26.	Great Falls–Salt Lake City	73,795	11,916	29,494.42	.403	103,398	18,069	44,691.04	.434
27.	Bay City–Chicago	71,454	26,209	23,326.25	.325	127,826	47,672	42,428.48	.334
28.	St. Louis–Omaha	.....	.....	.....	.....	45,834	8,420	6,610.44	.145
29.	New Orleans–Houston	32,330	5,536	5,536.31	.17	55,108	13,347	13,347.31	.24
30.	Chicago–Evansville	118,205	24,027	18,741.16	.158	140,463	25,963	20,251.91	.158
31.	Chicago Municipal Port-Grant Park Ramp	.....	.....	.....	.....	135	3,349	210.00	1.53
	Total	2,493,822	1,447,505	$2,867,814.63	$1.128	3,170,479	.....	$3,325,268.55	$1.045

mileage than during the preceding quarter while ten flew more. Thirteen carried less poundage and nine carried more. One company started operations and influenced considerably the establishment of a total for the group which exceeded that of the preceding period.

Cam	Route	July 1, 1929—August 31, 1929 Miles Flown	Lbs. Carried	Compensation	Revenue per mi.
1.	Boston–New York	24,302	25,077	$75,232.50	$3.10
2.	Chicago–St. Louis	69,222	15,831	40,072.29	.575
3.	Chicago–Dallas	250,355	78,548	235,642.50	.94
4.	Salt Lake City–Los Angeles	138,600	134,574	403,722.56	2.901
5.	Salt Lake City–Pasco	65,720	38,490	115,470.56	1.76
6.	Detroit–Cleveland	.....	.....	.....	.....
7.	Detroit–Chicago	.....	.....	.....	.....
8.	Seattle–Los Angeles	131,620	49,100	139,204.34	1.06
9.	Chicago–Minneapolis	133,975	44,763	123,097.13	.923
11.	Cleveland–Pittsburgh	29,550	12,459	37,374.93	1.26
12.	Cheyenne–Pueblo	27,014	19,881	16,501.23	.611
16.	Cleveland–Louisville	88,108	21,710	26,485.52	2.997
17.	New York–Chicago	245,941	317,714	251,415.51	1.02
18	Chicago–San Francisco	457,706	326,811	679,498.47	1.48
19.	New York–Atlanta	115,744	66,082	198,245.99	1.70
20.	Buffalo–Cleveland	66,896	18,446	20,468.79	.305
21	Dallas–Galveston	40,304	7,214	20,850.08	.517
22.	Dallas–San Antonio	64,526	14,313	41,364.93	.64
23.	Atlanta–New Orleans	60,188	16,257	28,395.65	.473
24.	Chicago–Cincinnati	95,106	15,430	22,675.62	.216
25.	Atlanta–Miami	82,956	18,423	26,897.30	.324
26.	Great Falls–Salt Lake City	78,864	14,827	36,696.05	.465
27.	Bay City–Chicago	117,401	43,709	38,901.36	.33
28.	St. Louis–Omaha	49,794	10,843	8,511.11	.172
29.	New Orleans–Houston	39,556	7,948	7,947.99	.20
30.	Chicago–Evansville	95,232	17,356	13,537.78	.135
31.	Chicago Municipal Port–Grant Park Ramp	486	11,385	810.00	1.665
	Total	2,569,166	1,347,191	$2,609,020.19	$1.015

The charts show the history of seven of the oldest contractors in regard to their income per mile flown and pounds carried per scheduled trip. The routes selected are the New York-Chicago, New York-Atlanta, Chicago-Dallas, Salt Lake City-Los Angeles, Chicago-San Francisco, Seattle-Los Angeles and Boston-New York lines. These were chosen for their geographical representation and to include short and long lines and old and new routes. The points by which the curves are plotted represent the figure for the quarter designated in the space at the left of the vertical line on which the point is placed.

It will be noticed in the graph depicting the variation of compensation that there are three sharp breaks, two during the second quarter of this year and one during the third quarter. In the case of one of these, the Salt Lake City-Los Angeles line, the cause of the drop lies in the mere fact that a double service was inaugurated. That is, the volume of mail remained about the same but it was carried by two planes daily instead of one. This accounts also for the same drop in the curve for the same route in the other chart, showing the variation of pounds carried per scheduled mile. With the number of scheduled miles increased there was a drop in the volume carried on each trip. The other two outstanding downward trends referred to are caused only by the normal relation between volume of mail carried and miles completed.

The right hand chart gives an excellent exposition of how much the mail loads per trip have increased in a very short time.

It should, of course, be borne in mind that these curves have been based on trips scheduled, not actually completed, and represent weight per trip rather than per plane, no account having been taken of the increasing frequency of using more than one plane per trip.

At the bottom of the group is the Boston-New York route. Glancing over to the left hand chart, we discover that the compensation per mile curve for the Boston-New York route climbs higher by a good margin than the curves for the two sections of the transcontinental. This means the company receives more per mile for its smaller load then do the other companies with their greater loads. This is brought about by the combination of a high rate of payment and a comparatively short route.

GENERAL NEWS

Aero Branch Report Issued

Air Travel Aids Business Says Young in His Review

WASHINGTON (D. C.)—Maj. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, predicts that the increased development and utilization of air transport will exert a marked influence on this country's business. This view was expressed by Major Young in the annual report of the Director of Aeronautics to Secretary of Commerce, R. P. Lamont, for the fiscal year ending June 30, 1929, which was issued this week. Figures and data released therein, show a continued growth in all branches of operations.

Trade areas now directly served by air routes, the report shows, contain approximately ninety million people and it is anticipated that by next summer, practically all of the larger centers of population and many of the intermediate sized cities will be directly connected by roads of the sky.

Scheduled Operations Double

On June 30, 1929, there were in this country 32 air lines carrying express, 47 carrying mail, and 61 carrying passengers. These lines were operating over 29,227 mi. of established airways, 10,183 mi. of which were lighted for night flying; in addition, 2,065 mi. of lighted airways were actually under construction.

During the fiscal year ended June 30, 1929, scheduled operations. which constitute approximately 15 per cent of all civil flying, had increased from 27,817 mi. per day to 69,029. Miscellaneous air services not scheduled—which include sight seeing, student instruction, crop dusting, aerial photography, mapping passenger service, advertising, charter or taxi cab service, and several other classes of operations—have increased so rapidly during the last three years that it is impossible to obtain authentic figures to indicate the progress of this class of flying.

Great Increase in Exports

Major Young estimates, however, that during 1926 more than 18,000,000 mi. were flown by miscellaneous operators; that in 1927, the mileage increased to 30,000,000; and that in 1928, the total increased to 60,000,000 mi. Private flying, too, is developing very rapidly because of the increasing use of aircraft for sport and pleasure and for the private use of business men.

Exports of aeronautic products during the first six months of 1929 exceeded the aggregate for the full year of 1928 by more than 41 per cent, despite the fact that the 1928 total almost equalled the combined value of exports for the three previous calendar years combined.

It is generally conceded throughout the industry, Major Young declares, that the Department of Commerce is contributing materially to the advancement of civil aeronautics, to the creation of a powerful reserve of aerial defense for use in case of war, and to the development of a nation-wide network of air transport lines for use in time of peace.

To Lower Business Costs

This advancement, moreover, will provide employment for a constantly increasing percentage of the population; will speed the movement of men, money, mail and merchandise; and will decrease the cost of distribution and thereby increase the purchasing power of the consumer's dollar. By facilitating hand-to-mouth buying, by reducing the necessity for keeping huge sums of money tied up in slow moving merchandise, by aiding in numerous ways to speed up commerce and industry, the further development of air transportation will lower the cost of transacting business materially, throughout the nation.

The activities of the Aeronautics Branch during the past fiscal year include the inspection and licensing of aircraft, the examination and licensing of airmen, the identification of aircraft, the establishment and enforcement of air traffic rules and regulations, the investigation of aircraft accidents, the assembly of all data pertaining to these subjects, the establishment and maintenance of civil airways, the equipping of airways with suitable intermediate landing fields, beacon lights, radio apparatus and other aids to aerial navigation, the maintenance of comprehensive airway weather service, the charting of airways, the publication of air maps, the conduct of scientific research and development work to create and improve air commerce facilities, the rating of flying schools, the publication of air commerce bulletins, the encouragement of municipal airport construction, the rating of airports, the issuance of detailed data on individual airports, the collection and dissemination of air commerce information, and the general promotion of air commerce, industry, and trade.

Reports Airway Work

Aids to air navigation established and operated by the Department of Commerce included on June 30, 1929, 10,183 mi. of lighted airways, 263 intermediate fields, 6,300 boundary lights, 1,455 obstruction lights, 881 24 in. revolving beacons, 518 flashing beacons, 45 upper air weather stations, 110 weather bureau stations, 54 airways division weather stations, 27 radio communication stations, 7 radio beacons and 8 radio marker beacons. The 1929 appropriation of $4,689,550 was expended for the establishment of aids on 4,266 mi. of airways; 17 different airways were included in this mileage on all of which air transport companies are operating on regular schedules requiring night flying all or part of the time over the entire airway of the section lighted.

At the close of the fiscal period, 13 experienced airplane pilots, 10 civil engineers and 5 airplanes were engaged in surveying airways. Four electrical and structural engineers and 18 inspectors of airway construction were engaged in the establishment of lighting equipment. Six radio engineers, 2 construction engineers, 12 radio electricians were engaged in experimental work, construction of radio stations, and installation of apparatus. Twenty airway engineers, 72 airway mechanicians, and 782 caretakers and attendants were employed in the maintenance of airways.

License Total Bounds Upward

During the past fiscal year, the Air Regulations Division issued a total of 42,338 licenses, license renewals, title transfers and export certificates—as against 14,083 for the previous year. Pilots' licenses issued increased over the preceding year 95 per cent; pilot licenses renewed, 480 per cent; student permits issued, 491 per cent; aircraft licenses issued, 153 per cent; identification marks assigned, 145 per cent; mechanics licenses issued, 16 per cent; export certificates issued, 90 per cent and transfers of title completed, 141 per cent. During the year, this division granted 121 approved type certificates for airplanes; 21 for engines; and 28 for propellers.

In addition, 65 different types of planes were examined and approved without being

(*Concluded on Next Page*)

Death of Foxes Laid to Airplanes

OMAHA (NEB.)—The death of 56 silver foxes on a farm at Meadow, Neb., is laid to airplanes flying too low, thereby frightening the animals to death or causing a stampede in which some of them were fatally trampled upon, according to the Nebraska Silver Fox Corporation which has filed a $40,000 suit against the Boeing Air Transport Company, whose craft, it claims, were responsible. The corporation states that the planes often fly over at an altitude of less than 300 ft. and caused most of the trouble during the months of April, May, and June when the young were born.

Announce Officers Of Curtiss Sales Firm

NEW YORK (N. Y.)—Officers of the newly-created Curtiss-Wright Sales Corporation have been announced by Walter H. Beech, president of that division. They are: J. A. B. Smith, Edgar N. Gott, and William B. Robertson, vice-presidents; C. W. Loos, treasurer, and George L. Mentley, secretary. Directors include C. M. Keys, chairman; Richard F. Hoyt, J. A. B. Smith, Walter H. Beech, C. W. Cuthell, and C. S. Jones.

Assistant sales manager is George L. Mentley, formerly of Curtiss Flying Service; and Stanley W. Jacques, formerly with Keystone-Loening, has been made advertising and sales promotion manager. Headquarters have been established in the Curtiss-Wright building, 27 West 57th Street, and this will be the distributing point for all sections.

The regional sales managers are: O. G. Harned, Northeastern division; Douglas Davis, Southeastern division; J. R. O'Connell, Middlewest division; E. K. Campbell, Central Northwest division, and E. B. Christopher, Western division. For the most part, the present dealers and distributors of the merged companies, will be kept, while others will be added in the course of expansion.

Aero Report Issued

(*Concluded from Page* 1032)

granted approved type certificates, and 13 types of engines were approved on the same independent basis. The total number of approvals granted to airplanes, engines and propellers during the fiscal year, therefore, amounts to 248—which is about three and one-half times the amount of work handled during the previous year. The number of physical examinations certified for pilots and student pilots increased from 11,688 during 1927-28 to 28,153 during 1928-29. The number of Department of Commerce medical examiners increased from 366 to 704.

During the period covered by this report, there were 493 violations of air commerce regulations and air traffic rules, 176 assessments of civil penalties, 76 suspensions of licenses, 21 revocations of licenses, 6 denials of licenses, 192 reprimands, $4,525 in fines collected, 6 public hearings and 12 cases referred to the Department of Justice.

The work of this division is resulting not only in better service to the aeronautic industry but also a guaranty to the public of higher standards of airworthiness and in approved aircraft and competence in licensed pilots.

Through its Aeronautical Research Division in the Bureau of Standards, the Branch has contributed largely to the development and improvement of aids to air navigation and to the promotion of safety and comfort in flight. Work accomplished by this division in co-operation with other units of the Department of Commerce during the year just ended, includes research on radio aids, investigations on airways and airport lighting, wind tunnel research, methods for reducing airplane noise, investigation of the strength of airplane joints and fittings, and type-testing of aircraft engines.

According to Major Young's report, lighted airways have increased from 2,041 mi. in 1926 to 4,468 mi. in 1927 to 6,988 mi. in 1928; total airway mileage has increased from 8,404 in 1926 to 9,122 in 1927 to 16,667 in 1928; mail carried has increased from 810,355 lb. in 1926 to 1,654,000 lb. in 1927 to 4,063,173 in 1928; passengers carried have increased from 5,782 in 1926 to 8,679 in 1927 to 49,000 in 1928; mi. flown have increased from 4,318,087 in 1926 to 5,870,489 in 1927 to 10,673,450 in 1928.

Totals for the calendar year 1929 are estimated as follows: Lighted airways, 12,500 mi.; total airways, 35,000 mi.; mail carried, 8,000,000 lb.; passengers carried, 85,000; miles flown, 16,000,000.

To Offer Two-Place "Mystery S"

WICHITA (KAN.)—Following a business trip to New York, K. K. Shaul, comptroller of Travel Air Manufacturing Company, announces that the firm's fast "Mystery S" low-wing monoplane will be put into commercial production early in 1930 as a two-splace sport machine. Speed of the craft will be somewhat cut down as a result of the changes. Introduced at Cleveland during the Races, the plane has since been demonstrated in the East and is now on tour in the South.

Lull in Operations Of Alliance Aircraft

ALLIANCE (OHIO)—Alliance Aircraft Corporation expects to resume full time operations soon, following a slump in activities which necessitated the furloughing of 60 men. A seasonal lull in the airplane industry and the failure to sell $200,000 of preferred stock recently authorized by the firm, are given as reasons.

However, latest reports indicate the stock issue has been taken over by stock brokers which, it is said, will make it possible to bring the firm's business back to ordinary levels in a few days. At present, fifteen men, most of them department heads, have been retained to assemble material on hand in order to meet the delivery schedule.

Plans are being made for the organizing of a strong sales organization, calling for a factory salesman in each of the twelve territories into which the country has been divided and district representatives in various sections. At present, there are seven district men covering ten of the 48 states.

A statement issued by Kermit Donaldson, general manager of Alliance Aircraft Corporation, denies recent reports and newspaper stories saying the company is for sale. Suspension of plant activities has not affected the flying classes or the night school classes lately inaugurated under J. P. McDermott.

Flies Scarab Inland To Light Plane Mark

KANSAS CITY (MO.)—Piloting an Inland Sport monoplane powered with a Warner Scarab engine, Willfred G. Moore on Nov. 3 officially broke the world speed record for light planes carrying a pilot and load equivalent to the weight of one passenger, as required by the F.A.I. ruling in this category. In making an average of 123.17 m.p.h. over a 100 km. course, Moore bettered the record of A. S. Butler, who established a mark of 119 m.p.h. at Stag Lane, England, in December, 1928.

The flight was made from the Municipal Airport over a course which is recognized as official. Observers of the successful attempt were Lieut. Isaiah C. Davies, commandant of the Army Air Corps here, and Wilbur Neely, Wichita, an official of the N.A.A. contest committee. The weight of the pilot and load totaled 330.5 lb., it was announced.

The Inland firm states that the plane used was a stock model which carried no racing streamlining. The Inland Sport is a high-wing two-place monoplane manufactured by Inland Aviation Company, Kansas City, under approved type certificate No. 259. It is offered with the LeBlond 60 as well as with the Scarab engine.

Ryan Safeguards Against Fires

ST. LOUIS (MO.)—Ash trays and cigarette cases are now standard equipment on all Ryan Broughams since the Forest Service of the United States Department of Agriculture reported several serious fires had been started by cigarettes and cigars thrown from planes. In a recent study, it was found that two-thirds of the cigarettes dropped from altitudes up to 1,000 ft. were still lighted when they reached the ground and cigars were still burning after similar drops. The Government has requested the cooperation of airline operators in curbing this new menace.

Design Wing Propellers to Give Helicopter Action

CONSIDERED A STEP TOWARD PERFECTION by J. C. Johnson, who developed it, this helicopter plane was recently put through test flights at the Milwaukee County Airport in Wisconsin. The plane took the air with nose engine power but then is reported to have climbed steeply with the aid of its two horizontal 9 ft. sub-wing propellers. A fuselage power plant actuates these air screws through an inter-airfoil drive. Johnson bought the plane from the Hamilton company.

T.A.T.,Maddux Merged on Nov. 16

Rate Reductions Effective On N. Y.-Los Angeles Route

NEW YORK (N. Y.) — Merger of Transcontinental Air Transport with Maddux Air Lines, Inc., has resulted in the T.A.T.-Maddux Lines. The consolidating companies started joint operations on Nov. 16.

Co-incident with this announcement, T.A.T. declared a reduction of almost 25 per cent, which became effective Nov. 16, on its service between here and Los Angeles. Now the trip either way will cost $267.43, which includes coverage for train, pullman, and plane fares as well as all meals except those on the train. The former rate was $338.10, plus the cost of all meals on the ground. This fare reduction also applies proportionately between intermediate points on the line.

Adds 1,000 Mi.

Actual merger operations of T.A.T. and Maddux were started several months ago with the purchase of controlling interest in the latter by the former. Under the new system, some one thousand miles of air lines will be added to T.A.T. operations and direct service between New York and San Francisco, Los Angeles, San Diego, and Agua Caliente, Mexico, will be possible under this arrangement.

Officials of both firms expect full schedules to be maintained during the winter months in view of the experience gained by the two operators in their respective territories.

Aero Firm Plans School Chain

LOS ANGELES (CALIF.)—Announcement of a national chain of flying schools, to be known as Standard Flying Schools and to extend from coast to coast of the United States, has been made by Lieut. W. Jack Frye, president of the Aero Corporation of California. The Aero Corporation flying school will hereafter be known as the Standard Flying School and will serve as the nucleus for the system to be developed and as the parent institution for all Standard Flying Schools which may be established. No change in operation of the school will be made, and it will continue as an Aero firm division. The expansion program contemplated calls for the establishment of flying schools in California, Arizona, New Mexico, and Texas.

Sikorsky Seeks Words

BRIDGEPORT (CONN.)—What would you say for "amerissager" and "aterrissager?" Sikorsky Aviation Corporation would like to know, as it is now looking for English words to replace these French terms, the first of which means "landing on water" and the second, "landing on land."

D.A.C. Craft Sell on Time Plan

NEW YORK (N. Y.) — For the purpose of financing the sale of airplanes on a time-payment basis, a contract has been signed between Commercial Investment Trust Company here and the Detroit Aircraft Corporation. The agreement wil cover both wholesale and retail orders.

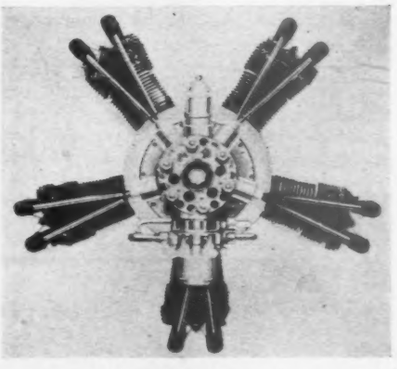
Total of 70,000 Saw Western Aircraft Show

LOS ANGELES (CALIF.)—Having attracted some seventy thousand persons, the Western Aircraft Show closed here Nov. 17, with a net profit estimated at approximately $10,000. The Courier Monoplane Company of Long Beach, was awarded a prize for having the best exhibit, while Theodore Schleuter, Southern California Ryan distributor, was adjudged best salesman.

Five gliders were among the 57 aircraft shown at the exposition, of which 16 were of Western manufacture while 41 were built east of the Rocky Mountains. The crowds were highly interested in craft painted in various color combinations or which had other striking features. While few actual sales were made, dealers reported the attendance of many interested buyer prospects. It is planned to make the Western Aircraft Show an annual event here.

(A feature story on the show will appear in the next issue of AVIATION.)

Genet Major Offered



PRODUCTION of the Genet Major has now been begun at Armstrong-Siddeley Motors of Canada, located at Ottawa. The new five-cylinder radial air-cooled plant, bearing a horsepower rating of 100-110, stands in a class midway between the Genet and the Mongoose manufactured by that firm. It is designed for use on the slightly heavier class of light planes and on light multi-engined craft. Manufacturer's specifications follow: Bore, 4.25 in.; stroke, 4.5 in.; displacement, 319 cu.in.; compression ratio, 5.2; normal r.p.m., 2,200; normal horsepower, 100 (British); maximum horsepower, 110 (British); weight, 250 lb.; weight per horsepower, 2.27 lb.; overall diameter, 38 in.; overall length, 36.2 in.

Postpone Allen Hearing Indefinitely

NEW YORK (N. Y.)—At this writing, the hearing of Lieut. C. B. Allen, Air Corps Reserve, scheduled because he made certain statements concerning conditions in the Rererve, has been called off indefinitely by the War Department.

The articles which drew the censure of Maj. Gen. James E. Fechet and other officials, appeared in the New York *World* and an air magazine. "The Embattled Air Reserves" was the title of the piece in the latter, which deplored the small number of planes available for the reservists in which to do their 48 hr. flying per year and told of substitution of slower type "training" craft in place of "service type" planes.

An investigation at Mitchel Field, the reserve station in question, has been ordered, and all papers and other documents of the case have been forwarded to Maj. Gen. Hanson E. Ely, commanding officer of the 2nd Corps Aera at Governors Island, N. Y., under whose jurisdiction Lieutenant Allen is listed.

The author of the articles states that he had no intimation of the proposed trial until noting the matter in a newspaper. He says that he will defend his stand before any board of inquiry. If found unfit by a commission Lieutenant Allen can be subject to dismissal from the service.

Now aviation editor of The New York *World*, Lieutenant Allen enlisted in the Army at Wilbur Wright Field, Fairfield, Ohio, in Dec. 1927, as a private first class in the Signal Corps Reserve. Subsequently, he was stationed at various posts throughout the country and has been in the Air Corps Reserve since 1920. He was recently re-appointed First Lieutenant.

Air Commissions in 8 States

WASHINGTON (D. C.)—For the enforcement of state laws on aviation, fourteen states have commissions taking care of that work while eight states have commissions appointed solely for that purpose, according to a statement from the Aeronautics Branch. They are Colorado, Pennsylvania, Ohio, Connecticut, Massachusetts, New York, New Jersey, and Michigan. In the other six of the fourteen states, the bodies handle other work in addition to aeronautics, while many other states place the job in the hands of police.

Ford Plant Addition Progresses

DETROIT (MICH.) — The $475,000 addition to the Ford Motor Company's airplane plant is expected to be completed, tooled, and ready for production on a full-time basis by Jan. 6, 1930, according to a recent announcement here. Since the plant's production was curtailed several months ago, most of the 1,200 employes have been working at the company's River Rouge automobile plant. These men, according to plans, will be transferred back to the airplane division.

Mobile Helium Purifier For Goodyear-Zeppelin

LOUISVILLE (KY.)—Mounted on a pneumatic-tired trailer body, making it usable wherever a truck can go, a portable helium re-purification plant has been constructed and delivered to the Goodyear-Zeppelin Corporation, Akron, Ohio by The Helium Company. It is believed to be the first movable one of its size, others previously built, having been mounted on railroad cars and therefore limited in mobility.

This outfit can be wheeled alongside the airship and is capable of purifying 1,500 cu.ft. of helium gas an hour, with a loss of only 1 per cent during the process. It can discharge the gas to any point desired at any pressure up to 2,000 lb. per sq.in.

Essentially the plant consists of two compressors, one of these compressing air to a high pressure. Then it is expanded in one of two columns, forming a liquid air bath at a temperature of 310 deg. Fahrenheit below zero. The second compressor brings the helium to a high pressure and passes it through a series of intricate copper coils (composed of nearly half a mile of copper tubing) in the column.

Thereupon the helium is submerged in the liquid air bath and the reduction in temperature under pressure liquefies out the impurities. These are drawn off and the helium, now at 98 per cent purity is passed into the containers under the desired pressure.

Its designers, R. R. Bottoms, director of research for The Girdler Corporation which operates the Helium company, and E. G. Luening, executive vice-president of Girdler and head of its engineering department, also developed the supply of fuel gas taken on by the Graf Zeppelin when it landed at Lakehurst after its first trip from Germany. The Navy department had been unable to supply the fuel and appealed to The Helium Company for the product.

Start 35-Place Emsco

LOS ANGELES (CALIF.)—Emsco Aircraft Corporation officials announced at the opening of the Western Aircraft Show here that one of the largest of passenger carrying planes has been put under construction by their firm. The craft will be a monoplane with a span of approximately 112 ft. and a carrying capacity of 32 passengers and crew of three. It will be powered by four Pratt & Whitney Wasp engines mounted in tandem pairs above the wing. Specially large windows are promised to give passengers the best in visibility.

Sikorsky Opens Chicago Office

CHICAGO (ILL.)—Sikorsky Aviation Corporation has opened a sales office here to take care of its rapidly expanding business in the Great Lakes territory. W. H. H. Vail, a former Army flier, has charge of the branch.

Test New Glider Catapult

SOUTH WELLFLEET (MASS.)—Experiments are being conducted at the Cape Cod Glider School with a new catapult which will permit glider launching without towing. The device has been developed by chief flight instructor Heinrich Knott. For taking care of minor mishaps to craft, a repair shop has been added to the school equipment. Officials announce that in 800 student flights during the summer, not a single pupil was hurt.

S.A.E. Discusses Use of Diesel Engine

LOS ANGELES (CALIF.)—Approximately 500 aeronautic and automotive engineers attended the S.A.E. meetings held here Nov. 12-13 under the joint auspices of the Society of Automotive Engineers and the Aeronautical Chamber of Commerce of America.

A paper presented by E. T. Vincent, the engineer who supervised construction of the engines for the British dirigible R-101 and who is now chief engineer for the Emsco Aero Engine Company, this city, predicted that the high speed diesel engine will soon be in popular use as an aircraft power plant, with material savings in fuel and cost of operation, and at approximately the same ratio of weight to horsepower as is now customary with gasoline engines, A 1,000 hp. diesel unit is now being developed for aircraft use by the Emsco Aero Engine Company. Other advantages of the diesel principle for aircraft engines were pointed out in a paper by Comdr. E. E. Wilson.

In discussing long distance passenger transport Harris M. Hanshue predicted regular schedules on the basis of 200 m.p.h., with a coast to coast service of approximately 12 hr. Harold Crary presented a paper for William E. Boeing, of the Boeing companies, which emphasized the great strides being made in night flying and which forecast a night transport service in the very near future which will make it possible for business men to travel from one corner of the continent to the other without losing any portion of a business day.

Aerial Advertisers in Columbus

COLUMBUS (OHIO)—An aerial advertising company has been formed in this city with a capital of $25,000 and 2,000 shares of no par value stock by Edmond N. Yantes, H. E. Musselman and Henry G. Binnis. The concern will use an electric sign device with interchangeable letters perfected by Robert G. Stewart and Virgil S. Jackson, Columbus pilots. A twin-engined airplane with a 90-ft. spread will be used, the signs being attached to the underside of the wings so they will be plainly visible at night. The concern will sell and lease the electric composite alphabetical panels for use by other aviators.

Detroit Aircraft Plans 100-Ton Metal Dirigible

DETROIT (MICH.)—The Detroit Aircraft Corporation, through Edward S. Evans, president, has announced plans for a 100-ton, 50-passenger metal-clad dirigible, engineered and constructed similar to the metal-clad ZMC-2, recently delivered to the United States Navy. Although no date for starting construction was made known, it was announced that designing work on the larger craft was well under way.

According to the scanty details revealed here, the proposed all-metal airship will rank as the fourth largest lighter-than-air craft in the world, being surpassed only by the Graf Zeppelin, the British R-101, and the airship being built for the U. S. Navy at Akron. The present design gives it a length of 520 ft., a diameter of 115 ft., and a gas capacity of 3,250,000 cu.ft.

Those figures will give the commercial metal-clad a much higher ratio of fineness than has the same corporation's ZMC-2. Roughly, its size will be two and one-half times the size of the ZMC-2 and its gross lift 16 times that of its predecessor. A total of 4,800 hp. is expected to give the ship a high speed of 100 m.p.h. and a cruising range of approximately 2,000 mi.

It is also estimated that the new dirigible can be completed within two years after start of construction. Just where this construction will take place was not revealed. Part of a statement issued by Mr. Evans co-incident with the announcement follows:

Metal Airships Experimental

"This size is not recommended because it is impracticable from the standpoint of present experience to build larger metal-clads; larger sizes are entirely feasible but better judgment favors this 100-ton ship as a conservative choice. Furthermore, it is the frank and firm opinion of those responsible for the metal-clad development, that any large rigid airship built within the next five or six years, no matter for what purpose and by whom built, is an experiment.

"Actual experience with the ZMC-2 shows conclusively that the metal seams hold gas almost perfectly even when subject to extreme variations in temperature. The total leakage, including seams, averages about one-third the leakage through gold-beater skin gas cells. There is also practically no deterioration of the gas due to back diffusion of air."

Curtiss to Expand in Kansas City

KANSAS CITY (MO.)—E. M. Oxley, sales manager of the Curtiss-Wright Flying Service here, announces that activities will be expanded to include aerial photography, the selling of Curtiss planes and airport equipment, the servicing and repairing of all makes of craft, an air transportation service, and a flying school.

Nebraska License Filing Rule Opposed

LINCOLN (NEB.)—Representatives of aircraft companies and individuals interested in aviation met Nov. 14 with the Nebraska state railway commission and appointed a committee to study the problems of aviation in Nebraska and later to confer with the commission, after which time a report will be published. The following were named to the committee: Max Kier, Lincoln; Milton Barratt, Lincoln, Lawrence Enzminger, Omaha; Harry Sidles, Lincoln; and Louis Thoelecke, Omaha.

During the conference, discussions were held on points in the law passed by the last Nebraska legislature dealing with the regulation of aircraft. Particular attention was paid to the provisions of the statute which states that every pilot in the state must file a certified copy of his Federal license with the railway commission. Aircraft officials argued that this would be an imposition upon the representatives of out-of-state concerns who send demonstration planes and pilots to this state, and who are here for but a short time.

It was suggested that a minimum time limit be set under which the pilot would not have to certify his license. Attorney Hugh LaMaster argued for the state commission that while the commission was empowered to enforce and enact regulations in line with the statute, it could give no ruling against the law which says that every pilot must have a state license.

Several changes will be necessary in the law which was introduced in the Nebraska legislature by Max Kier; and Mr. Kier suggested that such conferences would bring out the needed changes so that the next legislature could act on the matter.

Assistant Chairman Randall of the railway commission presided, and Richard Lees, Federal inspector for this district, explained the rulings. The Nebraska statutes are as follows:

Randall Explains Rulings

H.R.374 — Prohibits anyone not a licensed United States air pilot from operating aircraft within the state of Nebraska. The airplane used must also have met the Federal requirements as shown by a certificate and license attached to the machine. Pilots must carry their personal certificates. Nebraska peace officers are authorized to inspect aircraft and to demand production of licenses in order to ascertain whether the machines and the pilots are operating lawfully. Mechanics accompanying planes must also hold Federal licenses. The state railway commission is authorized to make rules and regulations, effective within the state, similar to those promulgated by the United States Department of Commerce. Penalty for violation of the act, or of rules and regulations, is a fine not exceeding $100, or a jail term not over 30 days, or both.

H.R.424—General enabling act for all cities to establish and operate aviation fields, either within or outside their municipal limits. Issuance of bonds maturing in 10 to 20 yr. at 6 per cent authorized, subject to approval by a majority vote of the inhabitants; or, in lieu thereof, a yearly tax of not over two mills may be authorized by the voters for term not exceeding ten years. Location and specifications of the airport must have the approval of the United States Department of Commerce. Local regulations not in conflict with Federal aircraft provisions may be made by ordinance. Any part of an aviation field not needed by aircraft operation may be leased or sold by the governing board.

Although the enforcement of the statutes is left up to the railway commission by the legislature, no financial provision for such proceedure was made. It was largely because of the failure of many pilots and mechanics to register with the commission that the conference was called. A special appeal is being made to peace officers over the state to aid.

Glider Plus Szekely Engine Equals Airplane

DEVELOPED BY WILLIAM E. CRAWFORD, Long Beach, Calif., this powered glider appears to be an early answer to the recent Aeronautics Branch predictions that gliders with attached engines would shortly be constructed. The craft has a span of nearly 40 ft., a 230 sq.ft. wing area, and weighs, minus engine, less than 200 lb. Construction is of welded or brazed steel throughout, tubing being used for all structural members and channel metal for the ribs and fairing. A 40-hp. Szekely engine furnishes the power.

Six More Planes Approved

WASHINGTON (D. C.) — According to certificate number, make and designation, type, power plant, useful load, and gross weight, the Aeronautics Branch granted approved type certificates to the following planes for the week ending Nov. 16: No. 271—Bach 3-CT-9, ten-place closed monoplane, two Wright R-760's and one Wasp 450 hp., 2990 lb., 8000 lb.; No. 272—Davis D-1-K, two-place open monoplane, Kinner 90 hp., 536 lb., 1461 lb.; No. 273—St. Louis Cardinal C2, two-place closed monoplane, LeBlond 65 hp., 521 lb., 1450 lb.; No. 274—Rogers RB-X, four-place flying boat biplane, Wright R-760, 1034 lb., 3430 lb.; No. 275—Mono-Aircraft Monocoach 275, four-place closed monoplane, Wright R-760, 1217 lb., 3100 lb.; No. 276—Parks P-2-A, three-place closed monoplane, Wright R-540, 897 lb., 2380 lb.

N.-B. Firm Exports Reported

MARSHALL (MO.)—That more than thirty-five shipments to foreign countries were made during the past month is announced by Nicholas-Beazley Company Export Division. Included in the list were: Bankok, Siam; Bloemfontein, South Africa; Sao Paulo, Brazil; Honolulu, Hawaiian Islands; Buenos Aires, Argentina; Honduras, and Germany.

Aviation Corporation Buys Outside Securities

NEW YORK (N. Y.)—Part of $20,000,000 cash surplus of The Aviation Corporation, has been invested in securities outside the aeronautical market, Graham B. Grosvenor, president, recently announced. A letter mailed to stockholders, telling of this move, contains the following:

"Although The Aviation Corporation officers have been advised that such investments are within the corporation's power under its charter, they, and your directors, would not want to continue such investment policy if it were opposed by the holders of a substantial portion of the capital stock. Accordingly, a meeting (at Wilmington, Del., Nov. 25) has been called to give the stockholders an opportunity to express their views on the question."

At a meeting of the board of directors a short time ago, it was decided to use the money in the purchase of securities as enlargement of the company's holdings was not desired at this time. The executive and finance committees of The Aviation Corporation approved the step.

Winter Flight for Selfridge Unit

WASHINGTON (D. C.)—Part of the winter training of the First Pursuit Group, stationed at Selfridge Field, Mt. Clemens, Mich., will take the form of a flight of one transport craft and eighteen pursuit planes from that station to Spokane, Wash., and return. The War Department has thus informed the Commanding Officer, Col. Charles H. Danforth, who will send an officer out in advance to determine upon the best route. One of the results of the trip will be to determine the success of planes operating in sub-zero temperatures away from their home base.

Says Over Expansion Caused by Competition

NEW YORK (N. Y.) — In an address before members of the American Institute of the City of New York on Nov. 16, C. M. Keys, president of Transcontinental Air Transport, Inc., declared competition had caused too rapid a rate of expansion in the aircraft industry during the past year. The easy access to too much money was cited as another important factor in the situation.

In speaking of the air mail, Mr. Keys said "it is no secret fact that within the past year, or so, there have been so many bidders with so much money and so little experience that practically all the routes that have been let in this later period, have been unprofitable to the contractors."

The value and size of what is called "flying service," was demonstrated by Mr. Keys in declaring that one company in the month of September, had in commission about 300 planes, was training 900 students, flew approximately 1,000,000 mi., and carried about 15,000 passengers. These activities resulted in returns of $300,000 and the firm in question declared only about one-third of its facilities were in operation that month.

Urges Private Operation of Airports

Speaking of government subsidies issued abroad which comprised about $70 out of every $100 received by air companies, Mr. Keys believes such a plan is feasible over there, but would not be so in this country. There they work on the theory that if government help keeps the rates low, quick increase in commercial operations would result in indirect profits to the government.

Norbert A. McKenna, vice-president of the American Airports Corporation, another of the speakers, urged private operation of airports, stating that results had shown most municipalities have failed in this capacity. Mr. McKenna also believes air transport will increase rather than decrease the usefulness of railroads just as the railroads were helpful to the development of waterways.

In mentioning the fact that there are some 1,000 airports in the country today, Mr. McKenna said, however, that "few are more than fields marked off and named. No airport in the United States can compare with a major airport on the continent. In isolated instances, good airports exist, but these are few."

Woolson Tells of Diesel

The third speaker on the progarm was Capt. L. M. Woolson, aeronautical and research engineer for the Packard Motor Car Company, who spoke on the development of the diesel aircraft engine. Some of its features for which it claims superiority to ordinary plane engines are, 1—its lack of an ignition system and carbureter which, among, other things, reduces the fire hazard, 2—its use of less volatile fuel, 3—greater reliability, 4—freedom from radio interference.

Captain Woolson has flown some 12,000 mi. in diesel engined planes.

To Dismantle Soviet Plane

NEW YORK (N. Y.)—"Land of the Soviets," the monoplane piloted here recently from Moscow by four Russians, will be dismantled at Miller Field, Staten Island and then shipped home, officials of the Amtorg Trading Company state. The fliers had proposed making a trans-Atlantic flight, but the Osoaviakhim, the Russion air society sponsoring their flight, deemed such an attempt at this time unwise on account of prevailing weather conditions.

Say "Mecaviator" Not Automatic Pilot

WASHINGTON (D. C.) — In speaking of the mechanical pilot or gyroscopic device which recently flew an Army plane most of the distance between Dayton, Ohio, and Bolling Field, one will say "Mecaviator"—and capitalize the M.

This new term has come from the Office of the Chief of the Air Corps, is to be put into general use immediately, and will apply to any automatic pilot control instrument. Just as "avigation" was a condensation of the words, aerial navigation, Mecaviator represents a shortening of mechanical aviator. The Army believes in conciseness and hopes the new coinage will receive general acceptance.

Drafting Changes Ready

NEW YORK (N. Y.)—Franklin DeR. Furman, professor of machine design, Stevens Institute of Technology, is chairman of a committee, sponsored jointly by the Society for the Promotion of Engineering Education and The American Society of Mechanical Engineers, which has prepared a proposed American recommended practice on "Method of Indicating Dimensions" for use in drawings and drafting room practice. Copies of the document may be obtained from C. B. LePage, assistant secretary, The A.S.M.E., 29 West 39th Street, this city, who will welcome any suggestions on the subject in question.

Ford Sold in Czechoslovakia

PRAGUE (CZECHOSLOVAKIA) — The Ford transport, which has been flown on a European tour this past season for demonstration purposes, has been sold here. It will be used on an airline. This machine was exhibited at the London aero show before the tour and since that time has carried more than 4,000 persons, has travelled about 15,000 mi. and has landed at 46 airports. LeRoy Manning was pilot.

Williams Says Firms Neglect Private Fliers

WILMINGTON (DEL.)—That there is a lack of effort on the part of the industry in putting across private flying to the public and that manufacturers are not catering sufficiently to the wants of the ordinary flier, are given as two reasons why there is a considerable surplus of light planes and engines this year.

These conclusions are made public by Air Investors, Inc., following research work of the situation, through President Harvey L. Williams, who says, "A commendable move toward the training of more business men and sportsmen to fly themselves is being made by aviation country clubs, in an effort to organize and maintain clubs at vantage points throughout the United States."

"To sell the people on the idea of private flying," he states further, the industry will have to use co-operative, single-purpose advertising of a high order in popular publications as well as trade journals, carrying the appeal of personal ownership operation of airplanes. Manufacturers have taken the initiative in getting considerable publicity for their products, but publicity alone will not get the desired results.

Thinks More Campaigning Needed

Even consistent advertising by individual units of the industry cannot accomplish the huge task, because the advertiser must concentrate on his own product. He appeals to a market that does not exist. The manufacturers have never gotten together in a room and laid out a campaign toward the single end of creating a market for light planes.

Manufacturers have not tried to learn what qualities in light planes would appeal to and sell to laymen. Builders are concentrating too much on planes for practised flyers. They develop designs on suggestions and criticisms of experienced airmen, seemingly forgetful of the laymen who are expected to buy them.

One design cannot possibly please both the beginner and the trained pilot. The trained pilot wants power, maneuverability, speed. The beginner or prospective beginner, wants inherent stability, slow landing, safety.

United-Carr Earnings $576,005

BOSTON (MASS.) — United-Carr Fastener Company, manufacturers of patent fasteners for aviation, automobile and other curtains, aviation and a variety of other clothing, reports earnings for the first nine months of this year of $576,005, or $2.30 a share on 250,000 shares of common stock outstanding. This is after depreciation, interest and taxes, and is 1.9 times dividend requirements. These figures compare with consolidated earnings of $614,148, or $2.45 a share for the two combined companies for the full year of 1928.

Exchange Clubs Back Many Aviation Projects

NEW YORK (N. Y.)—On Nov. 21, J. P. Muller, president of the National Exchange Club, and several members of that organization's Aviation Committee, will confer with aeronautical officials in Washington, including Maj. Clarence M. Young, F. Trubee Davison, Adm. William A. Moffett, and Chairman James of the House Committee on Military Affairs. The purpose of these contacts will be to gain information helpful in outlining the aviation program of the various branch Exchange Clubs throughout the country. In the past year, Mr. Muller stated, 800 clubs in 44 states took part in 851 projects for the advancement of aviation, which included the placing of 223 air-markers or signal lights, taking part in establishing and equipping 201 airports, and observing 217 air mail dedications. At the present some 210 plans for airports and other undertakings are under way or being outlined by the Exchange Clubs.

The cooperation of prominent railroad officials has been secured, the president said, in the work of placing air-markers along all main rail routes and the Exchange Club is to start a campaign for the placing of city names and other information on the roofs of stations throughout the country.

An advisory committee composed of aviation experts and authorities, is now being formed to develop plans for airways, markers, beacons, landing fields, and other features for a comprehensive system of national airways, later to be submitted for official consideration.

Bid for General Plane Rights

BUFFALO (N. Y.)—Several inquiries have been received here by William E. Robertson, trustee in bankruptcy of General Airplanes Corporation, asking information as to the possibilities of purchase of the General all-metal Model 107 Mailplane and the engineering data of its construction. Names of bidders have not been revealed to the public.

Comet Lessens Exhaust Noise

MADISON (WIS.)—For the purpose of eliminating exhaust noise, an arrangement whereby all seven exhaust pipes lead in an equi-curve spiral into the exhaust ring, has been tested out by the Comet Engine Corporation, according to John H. Geisse, chief engineer. The new ring is said to have increased the r.p.m. of the engine while the plane was on the ground and to have sent the oil temperature down instead of up.

Stinson-Cord Merger Officially Consummated

WAYNE (MICH.)—Saturday, Nov. 9, the merger of Stinson Aircraft Corporation of Detroit with the Cord Corporation, Chicago was officially consummated at a meeting of the board of directors. E. L. Cord was elected chairman, Edward A. Stinson, president; William A. Mara, vice-president; Raymond S. Pruitt, secretary; and William R. DeField, treasurer.

Mr. E. L. Cord has obtained enough Stinson stock to give him a controlling interest in the aircraft concern. Under terms of the merger, Stinson stockholders were given the option of receiving $17.50 per share for their stock or one share of Cord for two shares of Stinson holdings.

Some of the companies which compose the Cord Corporation are: Auburn Automobile Company, Duesenberg Automobile Company, The Limousine Body Company of Kalamazoo, The Columbia Axle Company of Cleveland, The Spencer Heater Company, The Lycoming Manufacturing Company, builders of automobile and aviation engines; and the Stinson Aircraft Corporation.

Better Boeing 204 Performance

SEATTLE (WASH.)—Boeing Airplane Company announces increased performance of the firm's Model 204 six-place flying boat following a change from the two-bladed to the three-bladed propeller. Several of the Wasp-powered machines are now under construction.

Planes Rescuing 15 On Ice-Locked Boats

NEW YORK (N. Y.)—Word received here by The Aviation Corporation from Carl Ben Eielson, its Alaskan representative, tells of the rescue of six fur traders and 1,300 lb. of fur from two vessels ice-locked in the Arctic Ocean off Cape North, Siberia.

The deed was accomplished by Eielson, holder of the Congressional Medal for his polar flights with Sir Hubert Wilkins, and pilot Frank Dorbandt, who covered the 500 mi. to the ships and return without mishap in planes equipped with skis. The two crafts used were a Hamilton all-metal plane, Wasp powered, and a Stinson monoplane.

Contrary to first reports, Eielson found there were two ships frozen in instead of one and fifteen passengers rather than six. Aboard one, the 60-ft., motor driven, Nanook, owned by the Olaf Swenson Fur Company of Seattle, Wash., the occupants include a Seattle fur trader and his daughter.

It is believed about six more flights will be necessary before all the persons and cargo can be removed. The value of the furs aboard the Nanook is estimated at approximately $1,000,000 while neither the name of the other boat or its cargo value has been ascertained as yet.

Eielson is vice-president and general manager of Alaskan Airways, Inc., a subsidiary of The Aviation Corporation and has acquired for that firm, Wein Alaska Airways, Bennett Rodebaugh Airplane Company, and Anchorage Air Transport, three Alaskan firms.

Let Dodge Plane Plant Contract

NEWPORT NEWS (VA.)—Construction is to start at once on the first unit of the plant for the Horace E. Dodge Boat & Plane Corporation plant here. Virginia Engineering Company of this city, has the contract. Seaplanes and amphibions will be built in addition to motor boats. A landing field is to be prepared in the future. The plant is located on the site of the former Camp Stuart.

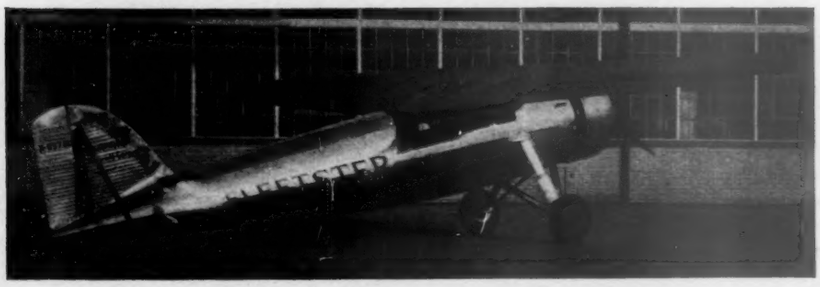
Many Visit Eagle Plant

KANSAS CITY (KAN.)—Since the opening of its factory, the American Eagle Aircraft Corporation three times has found it necessary to employ additional guides for sightseers through the plant. In eight months, it is said, more than 25,000 persons have signed the visitors' roster, according to E. E. Porterfield, Jr., president of the company.

San Diego Firm Changes Name

SAN DIEGO (CALIF.)—Officials of the San Diego Air Service Corporation have changed the name of the firm which is located on Lindbergh Field here, to Airtech Flying Service, Ltd. There will be no change in personnel.

New "Fleetster" Which Proved Fast in Tests



SHOWN ABOVE is the new metal "Fleetster" developed by the Consolidated Aircraft Corporation, Buffalo. The sesquiplane, which has a monocoque fuselage and uses Pratt & Whitney power, is reported to have attained 187 m.p.h. in initial speed tests, Lieut. Leigh Wade piloting. The craft is soon to be taken on a coast-to-coast tour with Capt. James Berry at the controls.

Mountain Tract Error Solved by Air Mapping

KNOXVILLE (TENN.)—When an error of 39,000 acres resulted from relying on old maps in the purchasing of Great Smoky Mountain park tracts in North Carolina and Tennessee, the park commission appealed to the Interior Department which recommended the air mapping of that section.

This was recently done by Charles Craig, of the Aerotopograph Corporation, in a plane piloted by Lieut. Lee Dice, field manager of the Curtiss-Wright Flying Service in Baltimore. Most of the mapping was done at a 13,000 ft. altitude, which was nearly seven thousand feet higher than the loftiest of the peaks.

G. M. Plew, chief photographer of Aerotopograph, directed the work, which took in 165 sq.mi. of mountainous territory, some spots of which were almost inaccessible by land because of trees and thick undergrowth. The negatives were developed here and then taken to Washington where they will be made into a topographic map of that section.

Aircraft Products Building Huge Floats

DETROIT (MICH.) — Aircraft Products Corporation, this city, is building what it declares to be the largest pair of pontoons ever constructed to be used in experimental work with a Ford plane. They are to be 32 ft. in length and 600 lb. each in weight, and are being designed to float a total load of 27,000 lb. A. Ralston Stalb, designer, is using hulls of the hollow V type to make possible easier landings with less spray.

One of the other features of the floats is to be their streamlining. Each nose will be quite narrow and the sterns are to graduate to almost a point. Anti-corrosion aluminum alloy is being used on the entire surface of the structures, and bulkheads will separate the nine watertight compartments in each float.

Ralph R. Irwin, company president, also announces that the firm is working on a new ski for winter flying as well as a new wheel and brake unit. Oildraulic shock absorbers and a tail wheel adaptable to an Oildraulic strut have thus far been the principal products of the concern.

Women Pilots to Meet Dec. 2

NEW YORK (N. Y.)—On Nov. 2, 26 women fliers met at Curtiss Field, Valley Stream, L. I., to organize a flying club and the second meeting to complete organization will be held on Dec. 2, at the home of Opal Logan Kunz, 137 Riverside Drive, this city. Those in charge of the affair were Neva Paris, Fay Gillis, and Wilma L. Walsh. Women pilots not receiving invitations are asked to communicate with Amelia Earhart, *Cosmopolitan Magazine*, 57th St. and 8th Ave., New York.

Civil Service Posts Open

WASHINGTON (D. C.) — Announcement is made by the U. S. Civil Service Commission of competitive examinations for the positions of Junior Aeronautical Engineer and Junior Mechanical Engineer. Full information may be obtained from the Commission at Washington or from the Civil Service Board of Examiners at post office or customhouse in any city. Applications must be on file in Washington not later than Feb. 4, 1930.

Glider Towing Tests In Miami This Winter

MIAMI (FLA.)—Dr. Wolfgang Klemperer of Germany, an authority on gliding, has written Hamilton M. Wright, Jr., director of publicity here, that he will bring a glider to Miami with him this winter for a plane-towing glider demonstration. Word received from Prof. R. E. Franklin, University of Michigan, states that his brother, Wallace, who has had 42 glider hours, is willing to be towed behind a plane from Ann harbor, Mich., to Miami. This would be the longest flight of the kind ever accomplished.

Donald Walker, manager of the National Glider Association, of Detroit, who has been co-operating with Mr. Wright in bringing the feat about, said that such a flight would be as sensational a performance as any participated in by any engine-driven plane in the last 12 months.

Hugh Allen, publicity director of the Goodyear Zeppelin Corporation, wired Mr. Wright that his company would supply capable assistance from its airship ground crew at the blimp hangar to handle the glider demonstrations.

It is planned to have the gliders here in time for the Miami-All-America air meet in January.

Four Eagles on Second Tour

KANSAS CITY (MO.)—Four American Eagle planes left here recently on a good will tour of the South and Southwest, complementing another tour which had been made by that aircraft company throughout the Eastern section of the country. One, a Phaeton, powered with a Wright J-5, is piloted by Miss Mildred Kauffman, a limited commercial flier. A Wallace Touroplane, another Phaeton, and an Eagle biplane, complete the group.

Canada Adopts Wing Slots

OTTAWA (ONT.) — The Department of National Defense announces that it has adopted the Handley Page automatic wing-slot as standard equipment for all machines being constructed for use by the civil and military branches of the Department. The head of the Handley Page Aircraft Company of England, Capt. F. Handley Page, has been in the city, conferring.

Effects of Lightning On Airplanes Studied

BARBERTON (OHIO) — Lightning and its effects on aircraft are being studied here at the laboratories of the Ohio Insulator Company, under the direction of Chief Engineer A. O. Austin, with the co-operation of H. H. Windsor, Jr., editor of *Popular Mechanics*.

Attended by representatives of the Army, Navy, Department of Commerce, Smithsonian Institution, National Advisory Committee for Aeronautics, Guggenheim Aviation Fund, United States Weather Bureau, and officials of airlines and airplane companies, the experiments on planes and models of various types, are taking several weeks.

Equipped with the highest powered outdoor apparatus of its kind in the world, with ordinary flying conditions simulated as much as possible, planes, parts and engines are subject to powerful bolts of artificial lightning. (It was here that balloons and other lighter-than-air craft were similarly tested several years ago, following the suggestion of Ward T. Van Orman, the famous balloonist.)

Many Instruments Used in Tests

These tests are an attempt to determine something definite concerning the dangers a plane runs in a storm, and to develop safeguards which may be needed. Among the instruments employed for the work is a synchronized camera, timed to record lightning flashes to the millionth of a second.

Among the various questions Mr. Austin and his assistants are trying to answer are: 1—what are the dangers from shock when a plane is struck? 2—will the insulation of the ignition system or on other parts of the machine break down? 3—in what way do the hot gases from the engines affect the path of lightning near the plane 4—what danger from fire exists? 5—what sort of protection can be afforded passengers, pilots, and craft after contact with lightning?

Detroit S.A.E. Offers Prize

DETROIT (MICH.) — For the best paper presented by a senior college student or first-year graduate on an aeronautic topic, fundamentally new and scientific in nature, the Detroit Section of the Society of Automotive Engineers will award a certificate and junior membership in the society (initiation fee and one year's dues). This annual competition has been established in memory of William C. Naylor, one of its promoters until his death in an airplane accident last summer. The prize will be awarded at the closing Aeronautic Division meeting here and papers entered for it must be in the hands of the Committee of Award, Detroit Section, S. A. E., General Motors Building, this city, not latter than Jan. 15, 1930.

BRIEFLY

President Ernest O. Holland of Washington State College, Pullman, Wash., is chairman of a committee on aviation for the American Association of Land Grant Colleges and Universities. It will concern itself largely with aviation courses in these institutions.

In covering 320 mi. between Detroit and Indianapolis, a plane with Packard Diesel engine used only 8 gal. of fuel, costing $.32 at present retail prices.

Rent-a-plane service is offered at Scully Airport, Detroit, by William Mulqueeny at $15 for one hour, $12.50 an hour for the first ten hr., and $10 an hour for longer flights.

Universal Aviation Corporation and Universal School employees have formed a social organization known as "The Goldbricks" which is open to all employees of aviation companies who have served in the Army or Navy.

Nelson Studebaker Riley and Franklin Studebaker Riley, Kansas City dealers and descendents of the founder of the Studebaker Corporation, are retiring from the automobile business to establish an aviation company.

Work will begin at once on a new airport near Trenton, Ont., where a training school intended primarily for service men from Camp Borden will be established.

A mailing list is being established by the Coast and Geodetic Survey for those who wish to be notified when new or revised airway strip maps are available for sale.

Gen. W. W. Atterbury, president of the Pennsylvania Railroad, and a party of 60 directors and officials of the company, inspected Port Columbus recently.

Development of aviation was one of the chief subjects considered at the annual session of the Connecticut division of the New England Council, Boston, Nov. 21-22.

Sikorsky Aviation Corporation, Bridgeport, Conn., will issue a monthly house organ beginning Dec. 1.

Foreclosure proceedings on Marshfield (Wis.) Airport have been started and the property will be sold at auction as a result of the death of G. Berghammer, mortgagee.

Possible discontinuance of air mail service, flying school and other activities at Blesch Field, Green Bay, Wis., is threatened by lack of funds to finance the field.

Bird Wing Company, St. Joseph, Mo., is said to be considering the establishment of a school in another mid-western city.

An air meet was held at Robbins Field, Marlboro, Mass., Nov. 9-10.

Steady increase in demand for switches to be used for airport electrical equipment is reported by Bryant Electric Company, Bridgeport, Conn.

The plane belonging to Richard F. Hoyt, chairman of the board of Curtiss-Wright Corporation, was temporarily put out of commission when he left it in a field while visiting the Valley Horse Show, Warrenton, Pa., and an inquisitive horse ate all the fabric from the tail surfaces.

Nine Nevada Air Lines Lockheed-Vega planes were used to transport the University of Nevada team to and from Los Angeles for a football game Nov. 9.

Capt. William E. Lynd, Air Corps, has received a Citation for Gallantry in Action, in recognition of his bravery in attempting to secure photographs of strategic importance despite enemy attack, in France Aug. 25, 1918.

Miami, Fla., has a new aviation police squad which will have the services of nineteen commercial pilots.

Test flights of a new plane developed by Pheasant Aircraft Company and designed for low-cost operation were scheduled for Nov. 18 at the company airport, Fond du Lac, Wis.

Detroit Aircraft Corporation is constructing a special Lockheed low-wing monoplane, equipped with dual controls, for Colonel and Mrs. Charles A. Lindbergh.

Total flights of American military planes in Nicaragua during the past twelve months number 7,651, of which 2,670 were for reconnaissance, liaison or contact. About 50,000 lb. of freight have been transported, and soldiers in outlying posts have received their pay regularly by plane.

Fairbanks-Morse Company, builders of marine Diesel engines, are said to be developing a Diesel airplane engine in their Beloit, Wis., plant.

Fort Worth (Tex.) Merchants' Association is planning a second air excursion to Mexico. It is expected that 40 planes will be used, to accommodate 150 people.

Andiz Aircraft Company, Inc., Ontario, Calif., has started production of eight Andiz cabin monoplanes, to carry Kinner engines.

The Goodyear-Zeppelin airship "Volunteer" is being used in the experiments to develop an acoustic altimeter conducted by Prof. Leo P. Delsasso of the University of California.

Rapid Aviation, Inc., Council Bluffs, Ia., has sent its three-engined Ford plane to Mexico for a three months' barnstorming tour, with Clyde Ice as pilot.

Skyways, Ltd., and London Air Transport Company, Ottawa, Ont., are reported as having completel negotiations for merger.

Officials of Black & Decker Manufacturing Company, Towson, Md., last week visited aircraft factories in Wichita, Kan., with a view to developing high speed electric tools for the aviation industry. President Black purchased a six-place Travel Air plane for company use.

Great Lakes Aircraft Corporation, Cleveland, Ohio, has shipped the first consignment of airplane equipment under a contract calling for delivery of $1,000,000 worth of planes and accessories by April 1, 1930.

Schools and Colleges

AERO CORPORATION OF CALIFORNIA is offering an advanced course including 250 hr. of flying three-engined planes, for students who have already had 1,000 hr. This is in connection with the school's contract to train pilots for Western Air Express, Standard Airlines, Fokker Aircraft Company, West Coast Air Transport and Mid-Continent Air Express.

NEPCO TRI CITY FLYING SERVICE, INC., Wisconsin Rapids, Wis., will move its flying school and about fifty students to Piper Fuller Airport, St. Petersburg, Fla., Dec. 1.

SPARTAN SCHOOL OF AERONAUTICS, Tulsa, Okla., has arranged a special advertising program for "Spartan Week" beginning Nov. 25.

CURTISS-WRIGHT FLYING SERVICE, Kansas City, Mo., has established a special ground school course designed to give business men a working knowledge of aviation.

MIAMI AIRWAYS, INC., Miami, Fla., has inaugurated a course in acrobatics and parachute jumping under the direction of P. C. Latham and Paul Golem.

PARKS AIR COLLEGE, East St. Louis, Ill., has made a survey indicating that over 95 per cent of the 475 graduates from its school for airplane and engine mechanics are at work in the aviation industry in this country, Alaska, Central and South America.

GRAND FORKS FLYING SCHOOL, Grand Forks, N. D., is making arrangements for a chain flying school to give instruction in small towns in the state on a special schedule.

UNIVERSITY OF MIAMI ground schools students have organized an aviation fraternity. Students of the school are engaged in building a plane.

POCAHONTAS AIR TRANSPORT COMPANY, Bluefield, W. Va., has leased the Asheville-Henderson Airport, Asheville, N. C., and will start a flying school there under the direction of Maj. H. O. Comp.

UNIVERSAL FLYING SCHOOLS have made arrangements with the Morris Plan Bank to offer a deferred payment plan for students.

POUGHKEEPSIE (N. Y.) EVENING SCHOOL is offering a course in aviation.

Representatives Named

BELLANCA—Albert H. Thurmond, Kansas City, Mo.; distributor for western Missouri and Kansas.

NICHOLAS-BEAZLEY (BARLING NB-3)—Southern Air Service, Inc., Tulsa, Okla.; Aeronautical Corporation of Canada, Ltd., Winnipeg territory: C. W. Whittenbeck, Miami, Okla.; J. L. Balmat and G. R. Seamans, St. Joseph, Mo.

WACO—W. C. Bright, Titusville, Pa., and vicinity.

WARNER—H. F. Wilcox Aeronautics, Inc., Tulsa; for Oklahoma.

PERSONNEL

LIEUT. E. E. DILDINE, holder of No. 1 license for combat pilots, has resigned as Chief Flying Instructor at the U. S. Navy Air Base at Sandpoint, Wash., to become associate flying director for Boeing School of Aeronautics, Oakland, Calif. W. E. WRIGHT, formerly with the Royal Air Force, has been appointed shop instructor for the school.

L. F. MERRILL has been appointed chief engineer of Axelson Aircraft Engine Company, Los Angeles, Calif.

MISS NOVETAH HOLMES, recently with Fairchild Aviation Corporation, is now assistant publicity director for Sikorsky Aviation Corporation, Bridgeport, Conn. W. H. H. VAIL has been appointed district manager at the new Sikorsky sales office in Chicago.

HARRY D. COPLAND is the new operations manager for Curtiss-Wright Flying Service of New England, at Boston. ROBERT FOOTE is manager of the sales department, and GILBERT WALLER is chief pilot of the photographic division. ELVAN TARKINGTON has been appointed sales promotion manager for Curtiss-Wright Flying Service of Indiana.

LIEUT. WOFFORD LEWIS has been elected president of the Air Corps Reserve Officers' Association at Kansas City.

LOUIS PROCTOR, winner of the 1929 National Airplane Model Contest, is now model builder at the Boeing factory, Seattle, Wash.

EDWARD MAYER is now publicity manager of Bellanca Aircraft Corporation, New Castle, Del.

GEORGE L. HAYS has been made copilot for Universal Air Lines between Kansas City and Garden City. ROY ENGELHARDT has been appointed demonstration pilot for Alexander Aircraft Corporation, Colorado Springs, Colo. FLOYD MAMMEN is now flight instructor at Wright Field, St. Elmo, Ill. All three are recent transport pilot graduates of Universal Flying Schools in St. Louis and Marion, Ill.

WILLIS C. BROWN, former president of Sparton Airplane Company, has been appointed vice-president in charge of sales for Warner Aircraft Corporation, Detroit, Mich.

RAY L. HOWARD has been appointed sales engineer for Fokker Aircraft Corporation of America, New York City.

GLENN MUFFLY, consulting engineer for Copeland Products, Inc., has been appointed to the executive staff of American Cirrus Engines, Inc., Marysville, Mich.

HECTOR FULLER has resigned as chairman of the committee on public relations of the Bankers' Industrial Exposition to become vice-president of City Transportation Corporation, New York City, which plans to operate all kinds of taxi services, including planes.

TRUMAN WADLOW, recently field manager for N.A.T. at Tulsa, Okla., is now pilot and demonstrator for Travel Air at Wichita, Kan. JOHN L. WRIGHT, of Dallas, Tex., succeeds him as field manager.

BEN F. REDMAN is the new president of Seagul Airlines, Inc., Salt Lake City, Utah.

WALTER INNES, JR., secretary and treasurer of Stearman Airplane Manufacturing Company, Wichita, Kan., has been made general manager.

STEPHEN A. MCCLELLAN, sales engineer for Pratt & Whitney Aircraft Company, has been transferred from Hartford, Conn., to the New York office of United Aircraft & Transport Company.

JOHN M. ROGERS has been made western representative of Wright Aeronautical Corporation, with headquarters in Los Angeles, Calif.

J. GERMOND has been named sales and traffic manager for Curtiss-Wright Flying Service of California.

L. C. SIMPSON is manager of the department for airport illumination recently formed by Curtiss Airports Corporation.

LIEUT. COMDR. E. E. WILSON, former head of the Engineering Division of the Bureau of Aeronautics, has resigned to take a position with Boeing System.

JAY. R. O'CONNELL, regional sales director of Curtiss-Wright Flying Service at Columbus, Ohio, has been transferred to St. Louis as director of sales activities in the midwest for Curtiss-Wright Sales Corporation.

H. H. REITZ has resigned as operations manager of Stewart Aircraft Corporation, Cleveland, Ohio, to join with BARNEY ROSSON in the formation of a new flying school at St. Petersburg, Fla. He is succeeded by WILLIAM BUTTERS.

AERONAUTICAL CALENDAR

Nov. 25	Hearing on proposed Southwestern Transcontinental Air Mail Route, Washington, D. C.
Dec. 9-14	Baltimore-Washington Aircraft Show, Baltimore, Md.
Dec. 10-16	National Aviation Week, Mexico, including air show and air display at Mexico City.
Dec. 16	Regional Airport Conference for New England, Bridgeport, Conn.
Jan. 13, 1930	S.A.E. Aeronautic Meeting, Miami, Fla.
Jan. 21	S.A.E. Annual Meeting, Detroit, Mich.
Feb. 5-12	New York Aviation Show, auspices Aviators' Post, American Legion.
Feb. 8-15	Cincinnati, Ohio, Aircraft Show.
Feb. 15-23	International Aircraft Exposition, St. Louis, Mo.
Mar. 6-15	Second Annual Pittsburgh Aircraft Show. Motor Square Garden, Brown Boulevard, Pittsburgh, Pa. Office is Aero Club, Pittsburgh, William Penn Hotel.
April 5-13	All-American Aircraft Show, Detroit.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.

AIR MEETS

Jan. 13-15	All-American Air Meet, Miama, Fla.

AIRPORT DEDICATIONS

Nov. 26	Ware County Airport, Waycross Ga.
Dec. 4-5	Roswell, N. M., Airport.

TRADE TIPS

It has been reported that

St. Paul, Minn., is receiving bids for the erection of a 200x80 ft. hangar with an adjoining structure 35x200 ft. for repair shop and office space, to cost about $90,000.

University Flying Club, Madison, Wis., is making plans for the purchase of a training plane.

Lincoln, Neb., is taking bids for construction of a sanitary sewer at the municipal airport, to cost about $4,000.

Crystal River, Fla., is in the market for a flashing beacon and steel tower.

Falcon Aero Club, Woodham, L. I., N. Y., is considering the purchase of planes and other equipment.

Oran V. Small, lessee of the municipal airport, Sherman, Tex., is planning to erect a two-plane hangar.

C. M. McCall, manager of the airport at Wewoka, Okla., will receive bids for the erection of a hangar.

Alexandria, La., is developing an airport and will receive bids for construction of a hangar.

New Firms Announced

GARLAND SCHOOL OF FLYING, Tulsa, Okla.; capital $100,000; by R. F. Garland, W. E. Lyons, R. L. Ferguson. Formerly Garland - Clevenger Aeronautics, Inc.

CONSOLIDATED AIR TRANSPORT, INC., Enid, Okla.; capital $100,000; by Harold Kindred, Luther Gray and George W. Zacharas.

WEWOKA FLYING CLUB, Wewoka, Okla.; capital $100,000; by C. C. Duncan, J. C. Whitesides, Mrs. F. B. Clark.

AERONAUTICAL DEVELOPMENT CORPORATION, South San Francisco, Calif.; capital $250,000; by Peter Lippi, A. Rider and others; to deal in engines.

AIR FERRIES, LTD., San Francisco, Calif.; to operate a passenger service to cities on San Francisco Bay.

CROMWELL AIR LINES, San Antonio, Tex.; capital $50,000; by L. L. Cromwell, J. M. Dullahan, and others.

SEBA AIRCRAFT COMPANY, St. Joseph, Mo.; capital $3,000; by Ralph Seaman, Joseph Balmat, Jr., John Netherland.

JUNE QUINN AIRCRAFT CORPORATION, Kansas City, Mo.; capital $15,000; by June Quinn, Tex LaGrove, Wm. M. Campbell.

PHELPS AIRPORT, INC., Phelps, Wis.; capital $10,000; by H. S. Tuttle, W. L. Covey, and others.

CLARKSBURG AIRWAYS, INC., Clarksburg, W. Va.; capital $25,000; by J. M. Carskadon and others, to develop Patton Field.

PLATTE VALLEY AIRWAYS, INC., Greeley, Colo.; capital $20,000; by Joseph L. Thompson, George H. Loustalet, Earl A. Waite.

BEND FLYING SERVICE, Bend, Ore.; capital $10,000; by James M. Shepherd, Leslie C. McCormick, Cordis J. Barber.

AIRPORTS AND AIRLINES

Consider Uniform Entry Airport Rules

WASHINGTON (D. C.) — Establishment of uniform airport and customs regulations to expedite international air traffic between the American republics was the first proposal brought up for discussion when the Pan American Commission on Customs Procedure and Port Formalities opened its sessions here on Nov. 18. It is anticipated that prior to the close of the conference next week specific recommendations will be adopted for simplifying rules and regulations governing the clearance of aircraft in international traffic between the Pan American countries.

To remove barriers that might hamper the operations of international air lines and the transportation of mail, passengers and cargo in foreign commerce, several countries have modified the usual procedure and other countries contemplate similar action. It is the intention of the Pan American Commission that the procedure adopted by the several countries shall be uniform. The necessity for modifying port and customs formalities which shall prevail at airports was recognized when the sixth international conference of American States held at Havana in Feb., 1928, drafted a convention on commercial aviation which embodies this principle.

Proposals Outlined

The recommendations adopted by the Commission on Customs Procedure and Port Formalities are expected to follow the proposals submitted on Nov. 18 by the governing board of the Pan American Union, which were outlined, in part, as follows:

"Each country might establish the airports where airplanes arriving from a foreign country may make regular landings, which shall be known as international airports. Appropriate officials would be assigned to these airports to perform the customs, police, sanitary and immigration formalities, and customs warehouses and postal offices would be provided.

"Commercial aircraft carrying passengers and cargo from a foreign country, which are to be landed at the international airport, might be required to furnish a modified manifest of cargo, a list of passengers, and a bill of health. When the airplane lands only for the purpose of refueling, for other purposes incidental to the continuation of voyage, for the purpose of trans-shipping merchandise or for transferring the passengers in transit to another country, the airplane might be made exempt from customs, police, sanitary and immigration formalities.

"Furthermore, if the owner, agent or pilot of the aircraft gives adequate notice of the proposed time of arrival and departure of the vessel, the resident agent might be permitted to perform all or any part of the airport and customs formalities in behalf of the owner or pilot, without injuring the legal status of the pilot or owner."

Much emphasis was placed by the conference upon the desirability of avoiding at the airports at the outset the maze of conflicting regulations which surround the entry and clearance of shipping at the international seaports. During their visit in Washington the delegates to the conference will be guests at a dinner given in their honor by the Pan American Airways.

Open Hawaiian Inter-Island Line

HONOLULU (T. H.)—Service between this city and the islands of Oahu, Maui, and Kaui has been inaugurated by Inter-Island Hawaiian Airways. The first planes leaving John Rodgers Airport here for Hilo, Hawaii, were accompanied by an escort of military machines. Two eight-ten passenger Sikorsky amphibions are in use on the route.

Curtiss-Wright Has Lower Charter Rate

NEW YORK (N. Y.)—On the basis of a careful analysis of operating costs for the last six months Curtiss-Wright Flying Service has drawn up a revised scale of prices for its charter service which is considerably lower than that previously in effect. The new scale includes a new rate for each individual type of plane the service is operating. In the case of a J-6 Travel Air cabin plane, for instance, the reduction is about 25 per cent, making the cost per passenger mile about $.09. This is figured on expectation of a full load for a complete round trip. The rate would be higher per passenger mile should the plane be only partly occupied.

When the service was expanded to its present national scope an arbitrary rate scale was established which would assure the company a profit, since there was no precedent to go by. A record of operations costs throughout the country was compiled. The company expects, of course, that increased patronage will justify the lower rates and decreased margin of profit. October was a record month for the service, it is reported. For the first time there were more flying students than employees at the fields. That is, there were 1,027 active flying students and 929 employees. About 378 of the company's 400 planes were used. There were 1,172 in ground schools. The company carried 13,913 passengers without accident.

New York & Rio Line Reports Much Progress

NEW YORK (N. Y.)—New York, Rio & Buenos Aires Line, Inc., has just issued a survey of the company's operation to date and its immediate plans. The preparations for the opening of the 8,903-mi. route between this city and the southern terminal are in an advanced stage. [Descriptions of equipment and routes have been printed in AVIATION from time to time]. The company has scheduled the opening of the Florida-Cuba section and the Buenos Aires-Rio de Janeiro section by Jan. 1 and the first through service over the entire route some time during February.

The route has been divided into eight divisions as follows: Division 1, New York-Tampa; division 2, Tampa-Port-au-Prince; division 3, Port-au-Prince to Port of Spain; division 4, Port of Spain-Para; division 6, Para-Pernambuco; division 7, Pernambuco-Rio de Janeiro; division 8, Rio de Janeiro-Buenos Aires. At seven base points along the route passenger terminals, hangars, radio stations and work shops are being built. Four of these plants will cost about $125,000 each and three will cost about $60,000 each. Ten intermediate ports of call are being equipped with facilities and complete loading and fueling equipment is being installed at all of the 43 stops.

Has Important Contracts

As previously stated in AVIATION, the company has contracts with Chile, Uruguay, Venezuela, and Argentina for transportation of the first 25 per cent of all mails destined for this and some of the South American countries. This will include regular first class mail as well as air mail and gives the company prior claim to all South American mail for this country.

It might be mentioned that the Tri-Motor Safety Airways, Inc., the first name under which this group operated, is now considered the southern operating company, functioning in Argentina, Chile and Uruguay. It is wholly owned by New York, Rio & Buenos Aires Line under which it operates. American International Airways, Inc., has a large financial interest in Nyrba, as the former is called. New York & Rio has 21 pilots, 23 mechanics and 32 radio, maintenance and field men in its employ now.

Lease St. Louis Radio Range Site

ST. LOUIS (MO.)—Lease of two acres of ground at the Municipal Airport on which the Aeronautics Branch will construct an airways radio station has been approved by the city. The station will be located on the east side of the field and the rent will be $20 per month.

Issoudun Mid-City Airport Announced

DETROIT (MICH.)—The establishment of an Issoudun field in America as a memorial to the men who trained at the great French flying school during the World War and to carry on Issoudun training traditions, was announced here recently by Maj. Thomas G. Lanphier, former flight commander at Selfridge Field, and war-time commander of the Issoudun school.

The field will be located in Ohio, 10 mi. north of Akron, and 23 mi. from Cleveland. Oddly enough, the site was originally selected by Capt. Ernest Lehmann, first officer aboard the Graf Zepplin, who played prominent rôle in the German lighter-than-air service during the war. It comprises 1,250 acres, with a total of 300 acres additional reserve. Captain Lehmann selected site in 1924 with a view toward establishment of a lighter-than-air base thereon for the Goodyear-Zepplin Corporation. Eventually, however, the Goodyear-Zepplin Corporation chose a site south of Akron, where construction of the company's first Zepplin for the United States Navy was begun recently.

The Issoudun Mid-City Airports Corporation was recently incorporated in Delaware, with Major Lanphier as president, and Col. Henry Breckinridge as chairman of the board. James Phelan, of New York, is secretary and treasurer; C. K. Wollam, of Akron, vice-president and general manager; D. Barr Peat, of Pittsburgh, vice-president and assistant treasurer; S. J. Brendel, H. C. Neel, Robert Guinther and Oakley Spaght are among the directors.

A 35-plane hangar is being erected on the site, and the instruction personnel is being built up. Six runways, averaging 3,000 ft. in length, have been started. By spring two additional runways of 7,000 to 9,000 ft. and two others of 5,000 ft. will be ready, it was said in the announcement issued.

Transport Firms Report Traffic

NEW YORK (N. Y.)—Two transport companies have reported recently their passenger traffic. The Aviation Corporation reports that a mileage of 723,604 was run up for October, a gain of 151,545 over the total for September. There were 999 fewer passengers than in September when a total of 5,140 was reported. More than 106,000 lb. of mail was flown. West Coast Air Express reports that during the four-month period ending Oct. 31, a total of 2,476 passengers had been carried.

Air Mail Shows A Substantial Gain

WASHINGTON (D. C.)—The volume of air mail transported in October once more showed a considerable gain after the slump in September from the August figure. The daily average for October, when there were 27 business days, was 22,633 lb. The daily average in September, when there were but 24 business days, was 21,856 lb. The gain in the total over September was 45,936 lb. The poundage by routes was as follows:

	Mi.	Aug.	Sept.	Oct.
Boston-N. Y.	192	13,122	9,821	10,765
Chicago-St. Louis	278	8,219	7,510	6,041
Chicago-Dallas	1059	41,600	39,977	39,012
Salt Lake-Los Ang.	600	69,505	64,221	73,466
Salt Lake-Pasco	530	20,344	24,126	26,162
Seattle-Los Angeles	1141	25,224	22,793	23,851
Chicago-Minn.	503	26,931	19,180	19,110
Cleveland-Pitts.	123	6,771	6,708	7,084
Cheyenne-Pueblo	199	10,401	8,903	8,934
Cleveland-Louisville	345	11,083	10,189	8,689
New York-Chicago	718	163,534	153,077	157,825
Chicago-San F.	1932	169,285	158,987	170,984
New York-Atlanta	763	33,832	31,062	31,584
Albany-Cleveland	446	9,814	7,980	12,402
Dallas-Galveston	320	3,673	3,561	3,657
Dallas-Brownsville	529	7,490	7,025	7,178
Atlanta-New O.	483	8,507	7,622	8,076
Chicago-Cincinnati	270	8,510	9,157	8,004
Atlanta-Miami	736	9,798	9,551	10,992
Great Falls-Salt L.	489	7,529	6,752	6,812
Chicago-Bay City	712	23,950	18,883	15,748
St. Louis-Omaha	403	5,623	5,814	13,785
New O.-Houston	319	4,200	3,596	4,095
Chicago-Atlanta	768	9,117	7,912	8,582
Pasco-Portland-Seattle-Spokane	449	0	11,282	18,787
Total		698,062	655,689	701,625

Increase 45,936.
Daily average: 22,633 for Oct.

Air Mail Losses By Fire Negligible

WASHINGTON (D. C.)—Although the air mail service has suffered three losses of mail by fire this month, the amount destroyed in proportion to the poundage carried is declared negligible. During the 11 yr. in which the air mail has been in existence, loss by fire has never been more than .05 per cent of the year's total. For the period 1923-24, 3,196,930 lb. were carried without a single loss by fire.

Fiscal Year ending June 30	Lb. Carried	Lb. Lost in Transit by Fire	Lost represented in per centage
1918	17,831	0	0
1919	230,251	258	.00112
1920	526,578	1,025	.00194
1921	1,120,852	376	.00033
1922	1,224,723	164	.00013
1923	1,696,896	0	0
1924	1,500,034	0	0
1925	232,514	155	.00066
1926	383,243	80	.00020
1927	1,032,727	327	.00031
1928	1,945,252	810	.00041
1929	5,626,483	3,562	.00063
1930 (July 1, 1929 to Oct. 31, inclusive), (approx.)	2,704,505	1,619 (approx.)	

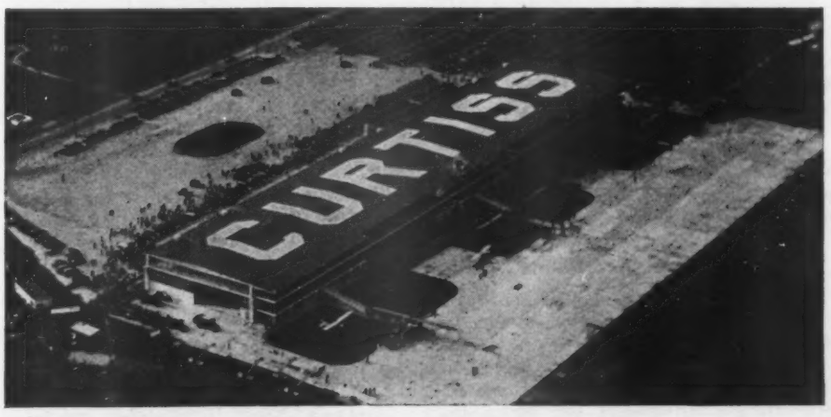
The Post Office Department from time to time has been flooded with letters suggesting the use of asbestos mail bags. Experiments with such bags have been carried on by the Department for 8 or 9 yr., with the resultant findings that asbestos bags are too heavy to be practical, are expensive, and are not completely fireproof.

Bags of pure asbestos, of which there is little on the market, would weigh between 15 and 30 lb., as compared with the weight of 2 lb. 3 oz. of the bags now in use. As long as the weight basis for air mail payment is used, and while weight of load continues to place a categorical limit upon flying operations, the use of a heavy bag is out of the question.

Furthermore, it has been found that as the fire burns and the metal parts of the plane settle down on the bags the contact is sufficient to break the hot bags open.

Post office regulations require the lining of all plane mail compartments with a light sheet metal. This constitutes sufficient protection against fires arising from short circuits or crossed wires. However, as most air mail fires result from crashes, this lining is not of great value in the prevention of mail loss when fires do break out.

New Type Hangar at Curtiss-Reynolds Airport



ONE OF THE features of this hangar at the Curtiss-Reynolds Airport, Chicago, which was opened Oct. 20, is extensive observation space provided by double-deck balconies. Passenger walks from the balconies to the loading platform on the large apron may be clearly seen.

N.A.T. Testing Carrier Pigeon II

CLEVELAND (OHIO) — A Curtiss Carrier Pigeon, latest type of air mail plane, is being flown between Cleveland and Chicago on the National Air Transport service. This is the first actual service for this model. The plane will be used on this route until it is fully tested. All N.A.T. pilots on this line will be given an opportunity to fly it and become acquainted with its operation. Should the plane prove satisfactory N.A.T. plans to supplement its present equipment with a number of these planes.

AIRPORT CONSTRUCTION PROJECTS

East

PROGRESS is reported in the construction of the first building at the New York Seaplane Airport, being developed by the American Aeronautical Corporation on Manhasset Isle at Port Washington, L. I. Much steel work has gone up, and the main assembly building and hangar have been bricked in.

The Austin Company has been awarded a contract for a $200,000 brick and steel hangar at the Round Hills Airport, owned by Col. Edward H. R. Green, of South Dartmouth, Mass. The building will measure 200 x 120 ft. and work will be started at once.

Contract has been awarded for the construction of a modern airport at Johnsonburg, Elk County, Pa., a municipal project being undertaken under the direction of Ralph McClintock, chairman. Plans call for the installation of three runways, 1,200, 1,800 and 2,000 ft. in length, respectively, and 200 ft. in width. A modern system of illumination will be installed.

The firm of T. H. Sweeney & Sons, Inc., Geneva, N. Y., has been awarded a contract for the construction of a modern airport, with hangar, club buildings and illuminating facilities at the former Geneva Driving Park. The project, which will be under the management of a group of local business men, will be under the direct supervision of William Payne as superintendent.

Work will be started immediately on erection of a 52 x 60 ft. hangar at the Canaan, Conn., Airport, to accommodate six planes. Trees surrounding the field are being cut to allow extension of the east and west runway.

A 40x40 ft. hangar is nearing completition at the private airport operated by Floyd G. Sickler, Whitesboro, N. Y., near Utica.

Newburgh, N. Y., is to build a 320-acre municipal airport, according to plans drawn up by the American Airports Corporation of New York City. An administration building, hangars, and runways are included in the plan.

Work is about completed on the control tower on top of the Buffalo, N. Y. municipal airport administration building.

Central

Guardian Aircraft Company, Moberly, Mo., of which Derek White is president, is establishing an airplane plant, ground school and flying school, and is soon to erect 45x65 ft. administration building, to be followed by hangar and other buildings.

The International Derrick & Equipment Co., of Columbus, Ohio, is formulating plans for the erection of a combination aero beacon and observation tower near New Bedford, Mass., to be 1,000 ft. high. The base of the tower will be 175 ft. square, while the distance to the first horizontal member will be 150 ft. The top of the tower will be 16 ft. square and will support an aviation beacon weighing five tons. It will throw a light of 1,500,000 cp. and its beam may be visible 300 mi. away. The light is now under construction. The tower will serve as a beacon and a basis for scientific observations.

Sidles Airways, Inc., has announced plans for the construction of a modern airport at Lincoln, Neb., to cost approximately $500,000. A tract of 320 acres has been acquired, and contract will be let soon for a $50,000 hangar.

Bennett Airways, Inc., is building a $25,000 hangar at the Kansas City Municipal Airport.

Acquisition of a small parcel of adjacent land has enabled the Dekalb County Airport at Waterman, Ill., officials to lengthen the east and west runway to 2,000 ft. and the north and south runway to 2,200 ft. The work of removing the boundary lights necessitated by the change and other tasks have been completed.

The Wichita Falls Airport Company, Inc., Wichita Falls, Tex., has increased its capital stock from $25,000 to $75,000 and will use the additional amount for permanent improvements at the municipal airport, including a modern administration building.

An 85-acre tract just south of Moscow, Ida., has been secured for an airport. The field is being put in condition, including the construction of runways.

The Springfield (Ill.) Chamber of Commerce recently provided at the Springfield Aviation Company's airport a standard beacon light, boundary lights and obstruction lights and a battery of six flood lights, which it had previously provided for the air mail field west of the city, before the mail plane began to land at the commercial port.

D. L. Erickson, Lincoln (Neb.) city engineer, has approved the plans for steel construction in the new hangar being built at the Lincoln Municipal Airport by the Lincoln Flying School. The hangar is about half completed.

Frank D. Hedrick has purchased an 80-acre farm northeast of Olathe, Kan., and will develop as an airport for that city, to be known as the Buddy Rogers Field.

The construction of a $135,000 terminal at the Dayton municipal airport here by the Seaboard Airways, Inc., has been announced by Warren B. Ferris, president of the system.

The Buckley Aircraft Company, 237 N. Water Street, Wichita, Kan., will at once begin erection of a 63 x 102 ft. hangar at the Central Avenue Airport.

South

Laurel, Miss., has started work on a municipal airport, which should be ready for use by Jan. 1.

The Abilene (Tex.) Air Terminal is nearing completion. Three oil-treated mixed-in-place runways are being installed, in addition to a taxi strip of hard-rolled calechi, connecting the runways with the hangar and loading platform in front of the terminal building. The airport manager, Mr. Derryberry, has moved into his apartment on the second floor of the steel and brick terminal building. The night lighting system is being tested now. The work is being done under the supervision of the B. Russell Shaw Company, Inc., of St. Louis.

E. E. Freyschlag, the chairman of a committee of the Chamber of Commerce of Eastland, Tex., is having plans prepared for an airport, to include hangars, administration building, service building, etc.

The Monroe (La.) airport of 147 acres is to be enlarged by an addition of 70 acres of land adjoining Selman Field.

North American Air Lines, Inc., Hunt Building, Tulsa, Okla., is planning an airport of 100 acres at Sapulpa, Okla., with hangars.

Standard Airlines, of El Paso, Tex., of which Walter A. Hamilton is vice-president and chief engineer, plans enlargement of its shops.

Work has been started on the radio beacon installation at Candler Field, Atlanta.

The Valdosta (Ga.) Chamber of Commerce has leased a 140-acre tract of land, for the development of an airport. The field will have three runways, two over 4,000 ft. long, and one over 3,500 ft. long.

West

Citizens of Palmdale City, Calif., which is located on the edge of the Mojave Desert, 120 mi. east of Los Angeles on the Los Angeles-El Paso airway, have donated their services to complete the clearing and grading of Palmdale Airport. This field comprises 160 acres and now has two graded and rolled runways 120 ft. wide, the northeast southwest runway being 3,000 ft. in length and the east-west runway 1,600 ft. long. Prevailing winds are from the Southwest. The field is at an altitude of 2,700 ft. and because of its freedom from fog has been found an invaluable emergency landing field for planes operating over the airways east from Los Angeles.

About 30 acres have been bought for the new Kelso (Wash.) Airport and the construction of the first runway has been started. The field will be triangular in shape.

Aircraft Industries, Ltd., 935 East 14th Street, Oakland, Calif., has begun erection of $60,000 factory building near the Waterford Road, Modesto, Calif.

Preparatory to application for a Department of Commerce rating, additional landing field area has been graded, additional drainage completed, and other improvements are under way at Oakland Airport.

West American Aviation Corporation has taken over an option of 120 acres at San Jose, Calif., for the development of a $250,000 airport.

Missoula, Mont., is planning the immediate constuction of a 58x60 ft. hangar at the municipal airport.

Construction is to start on a $4,000 hangar at the Yakima, Wash., Airport.

Improve Radio Marker Beacons and Indicators

WASHINGTON (D. C.)—Development of radio marker beacons has been receiving special attention from the Airways Division of the Lighthouse Bureau. Research to determine the best specifications for these beacons has led to the conclusion that a loop antenna and an operating frequency of about 40 cycles will be most satisfactory, giving a sharp change of signal when the plane is directly over the marker, and also freedom from interference with the main beacon indicators.

These marker beacons will be used in places in conjunction with visual marker beacons, and it is also anticipated that the new type will be of great assistance as part of fog landing systems. A circuit has also been devised whereby the marker beacon located directly between two main beacon courses may transmit simultaneously on both frequencies employed, so that the signal may be received on either tuning of the plane receiving set. The reed indicator for receiving marker beacon signals in planes has also been redesigned to obtain greater sensitively with reduced weight and size.

Tuyls Directs New Curtiss Ports

NEW YORK (N. Y.) — Following a nation-wide inspection tour on which he was accompanied by Walter S. Marvin, chairman of the board, William F. Carey, president, David Visel, vice-president, and other officials of Curtiss Airports Corporation, Jack Tuyls has been named to supervise personally the construction of all new Curtiss airports west of the Mississippi. He will start immediately for the West. The construction projects which will occupy his immediate attention are Alameda and San Mateo Airports at San Francisco, and developments at Los Angeles, Houston, Tex., and St. Louis, Mo. The total cost may exceed $10,000,000.

Canadian Air Mail Progressing

OTTAWA (P. Q.)—Air mail for Aklavik, near the mouth of the Mackensie River, in the northern part of Canada, will leave Edmonton Nov. 26, Jan. 21 and March 25. The parcel post rate will be $1.00 per pound. Trading posts on the airline between these two cities will have a weekly or monthly air mail service, depending on the distance. The parcel post rate from Edmonton to Great Slave Lake will be $0.50 per pound. The so-called prairie air mail service which will link Edmonton, Winnepeg, and Calgary is expected to be in operation Dec. 2, following the completion of lighting installations.

Midcontinent Opens New Line

WICHITA (KAN.)—Midcontinent Air Express opened its new Kansas City-Denver line on Nov. 11. C. A. Nickerson has been made traffic agent for the company in this city.

Order 40 More Radio Beacons

WASHINGTON D. C.)—An order for forty additional radio range beacon transmitters has just been placed by the government, according to an announcement by Capt. F. C. Hingsburg, chief engineer of the Airways Division of the Department of Commerce. It is reported that delayed and interrupted schedules on the New York-Chicago route have been reduced more than 30 per cent by the use of radio beacons.

Mail Formula Rests As Conference Looms

WASHINGTON (D. C.)—No decision on the air mail formula is expected to be made by the Post Office Department for several weeks. Assistant Postmaster General W. Irving Glover's absence from Washington this week, along with conferences which members of the Department have been holding with the House Appropriations Committee, have delayed action on the air mail formula.

A hearing of great importance to air mail carriers and prospective carriers is to be held Nov. 25. At that time representatives of airlines, and of southern cities, will be heard on the proposed southwestern mail route. This is expected to be one of the longest and most important routes in the country, consequently the proposals of the various lines and cities will probably be spirited. Two propositions have already been submitted to the Post Office Department. They were made by Southern Skylines, Inc., and Southwest Air Fast Express, Inc., acting as one body, and American Airship Association, Inc. No consideration will be given them until the route has been agreed upon and advertised.

Buffalo Port Men Organize

BUFFALO (N. Y.) — Organization of the Airport Operators' Association has been effected here, George E. Marlatt, local Ford superintendent having been appointed secretary pro tem. The organization comprises officials of the concerns using the Buffalo Municipal Airport and has as its purpose the movement to secure better conditions at the local port. At present the association is made up of the following: Curtiss Flying Service, represented by Lee Chase; Colonial Western Airways, represented by W. Heath Proctor; Ford Motor Company, represented by George Marlatt; Wright & Esenwein, represented by August Esenwein; C. Dallas; Inc., represented by Charles Dallas.

W.A.E. Installs Fokker F-14

LOS ANGELES (CALIF.) — The first of an order of six Fokker F-14 mail and passenger planes has been placed on the Los Angeles-Salt Lake City mail route by Western Air Express. Other planes will be placed in service as rapidly as delivery is made. The new planes are of the six passenger and mail capacity, parasol wing type, with pilot in the rear upper portion of the fuselage.

Contract For Building Specifies Roof Airport

LOS ANGELES (CALIF.) — Contracts have been let for a twelve-story building at the corner of Jefferson and Main streets, this city, construction to start June 1, 1930, in which the roof has been especially designed for aircraft landings. The building itself will be 980 ft. long and 152 ft. wide, with the greater length in the direction of the prevailing west winds. Projecting platforms around the roof will increase the available landing area to approximately 200 x 1,200 ft.

Designed as an industrial loft building, the structure will cost approximately $10,500,000 to complete. Special facilities have been incorporated in the design to care for airplane traffic and for air industries in the building. The entire top floor below the roof will be devoted to hangar facilities and depot accommodations for passengers and freight. Giant elevators will lift planes of transport size from the top floor hangar to the roof take off runway. Landing and launching devices are planned as an added safeguard. The contract for construction of the building has been granted to the George A. Fuller Co., of New York.

Speed Up Guatemala Schedule

LOS ANGELES (CALIF.) — Elimination of undue delay in loading mail at Tia Juana, Lower California, on Guatemala-bound planes of Pickwick-Latin America Airways, has made possible a speeding of schedule by one full hour at all points along the route, the planes now arriving in Mexico City at 1:30 p.m. of the third day instead of 2:30 p.m. as formerly. According to Thomas E. Morgan, general manager, planes operating on the new schedule will leave Grand Central Air Terminal, Glendale, at 8:30 a.m. on Sundays, Tuesdays and Thursdays, San Diego at 9:45 a.m., Tia Juana, 10:15 a.m., Nogales, 4:40 p.m., with all other stops advanced one hour. Northbound schedules remain unchanged.

Omaha Named Transfer Point

OMAHA (NEB.) — This city has been designated as a transfer point for South American mail from the Pacific Coast, the mail being transported to Omaha by Boeing from San Francisco. On arrival in Omaha the mail is transferred to the Universal lines and flown to Kansas City. From there it is taken to Evansville (Ind.), then south to Miami and Havana, etc.

Beacon Tenders to Organize

WATERMAN (ILL.)—Pioneer airway beacon keepers of the middle west will meet at the Dekalb County Airport in the near future to form an organization of their own. Some 52 men are eligible but to facilitate matters this organization will be composed of those from Bryan, Ohio to Iowa City, Ia.

FOREIGN ACTIVITIES

R.101 Air Trials Almost Completed

Full Speed Tests Declared Success

By Aviation's British Correspondent

LONDON (ENG.)—In the full speed trials of the airship, R.101, carried out at night over the English Channel in order to secure equable weather conditions and easily sighted lighthouse marks, the ship registered a top speed of nearly 70 m.p.h., and while maneuvring at speed it handled so well that to all intents and purposes it may be regarded as now qualified for the British Certificate of Airworthiness.

Full speed was achieved with the Beardmore Tornado 850 hp. compression ignition engines, and Lt. Col. V. C. Richmond, the chief designer, who was on board, said that if anything the ship was flying more smoothly at full power than at cruising speed. Even more satisfactory is the fact that there is no creaking at all in the airship when in flight, a quality which the older ships never possessed, and Major Scott remarked that there is a feeling of strength and resilience about the whole structure which inspires a high degree of confidence.

Design Tests Remain

There are other tests to complete at the time of this despatch but these are what may be described as design tests rather than trials of the ship's behavior, in which Colonel Richmond is seeking to ascertain quantitatively that the aerodynamic qualities correspond with design calculations. So far there has been a very satisfactory correspondence, and still there has been no occasion to bring the servo-motor gear into operation to relieve the physical strain on the elevator and steering coxswains.

Apparently the total displacement of R.101 will be 150 tons, though no exact figure is yet available; and as the official disposition of that lift has not yet been announced it is idle to speculate as to the amount of actual pay load she will carry.

Gradually, the minor defects which are inevitable in any new piece of machinery are becoming evident, and R.101 during her full speed trial had three of the four ahead engines out of commission in turn. The stoppages were merely an installation trouble and were corrected by readjustments.

Another minor trouble affected the starting engines, which are four cylinder Ricardo petrol units of a new type. These Ricardo engines are only temporary, for it is hoped to replace them by a little 30 hp. four cylinder compression engine, also made by W. Beardmore and Sons.

A very big improvement will have been made when a duralumin propeller blade can be found able to stand up to the torque of the engines. Then the reversing hub mechanism can be brought into play, and all five engines used for forward or reverse action. This is badly needed.

It is important to explain how it was R.101 recently stubbed herself on the masthead. When R.101 came back from her speed trials Major Scott seemed to be planning an even quicker landing than usual. He came up to the aerodrome at quite a high speed and dropped the main cable which the ground party at once hitched onto the main mooring mast cable. Then the ship was allowed to rise while the one stern engine going full speed just managed to take all weight off the ship as she came level with the mast.

Damage Not Extensive

Fortunately, subsequent examination showed that only one of the steel tubes in the horizontal pyramid of tubes which take the loads from the nose coupling and subsequently distribute the strain back into the first third of the ship had been damaged. This, too, had merely elongated under a deflection of 1¼ in. in the middle of the tube, leaving the rest of the ring of tubes unshaken, a useful testimony to the general strength of the nose. Each tube is merely bolted in, so it was only a few hours' work to take it out and replace by another. This was done quite easily at the masthead, and the reefing girder which takes no load at all was merely patched in place.

There seems no doubt that the principle of three point mooring is sound enough, but it is evident that there is more to learn about the actual practical carrying out of the operation, though this seems merely a question of further experience both on the part of the airship commander and the officer in charge of the mooring mast.

Luft Hansa Changes Ocean Plans

BERLIN (GERMANY)—Luft Hansa is reported to have abandoned its plan to use flying boats on the Cape Verde-South America section of its proposed service between the continents. Boats will be used for this section after the policy of the French firm. This decision follows an extensive period of experimenting with Rohrbach flying boats, which will be used on the water jumps between mainland and Cape Verde and probably between Pernambuco and Fernando Noronha, an island off the coast of South America.

French Make Fast Trips to Madagascar

PARIS (FRANCE) — Two trips to Madagascar recently undertaken both succeeded magnificently, despite the difficulties associated with long flights in desert countries. MM. Goulette, Marchesseau and Bourgeois, in a Farman 190 monoplane, 230 hp. Salmson, reached Tananarive, the capital of Madagascar, on Oct. 27, thus joining Paris to the great French colony in 10 days, 8 hr. and 40 min. For the first time in history, the mail from France was delivered in less than eleven days. The total distance of 7,750 mi. was covered in eleven hops varying between 465 and 900 mi.

Splendid as it was, the record did not stand very long. On Oct. 28, MM. Bailly, Reginensi and Marsot left Le Bourget with a view of improving the time of their colleagues. They used a Farman 190 too, fitted with a Gnôme Rhône Titan 230 hp. engine, the same machine which served them so well last spring during their record journey from Paris to Saigon and back. Taking a slightly different route than that followed by Goulette, they began by a 935 mi. non-stop flight, from Paris to Oran, including the crossing of the Mediterranean Sea. On Nov. 5, they landed at Tananarive. The precedent record was smashed by 52 hr., the total time elapsed since the start being 8 days and 5 hr., for a total distance of 7,300 mi. covered in 9 hops, each of 620 to 995 mi.

France-Madagascar Line Formed

PARIS (FRANCE) — The Air Minister has just signed the convention with the Compagnie Transafricaine for operation of the France-Madagascar airline. The capitalization of the new company is to be $391,000, divided as follows: one-third to the government, one-third to the Compagnie Générale Aéropostale and one-third to the Compagnie Air-Afrique. The duration of the contract is to be 20 yr. As soon as the decree is signed by the Minister of Finances, a bill will be introduced to parliament.

France Orders Tunnel Tests

PARIS (FRANCE)—Wind tunnel tests of scale models will hereafter be required before the French government approves any order for new airplane designs, or before airworthiness certificates are granted. In addition, models of all planes now in service must be given wind tunnel tests as soon as is practicable, according to the announcement by M. Caquot, chief of French Technical Services.

Foreign News Briefs

The Gipsy-engined Moth plane which recently completed 600 hr. of flying without an engine overhaul is said to have used only two cents' worth of gasoline and oil per mile.

Sir Henry Segrave is to re-enter the field of aviation in a new British company which has very powerful financial backing.

The Royal Services Museum, Whitehall, London, has an extensive exhibit of model planes, showing development from the first Wright machine to the large modern transport.

Sir William Morris, head of the automobile firm which bears his name, is reported to have plans for producing airplane engines which will cost less than $5 per horsepower.

Nearly $40,000 was awarded to Costes and Bellonte by the French government as a result of their record-breaking flight to Manchuria. They plan to return via Karachi, India, which will mean a 4,000-mi. non-stop flight from Hanoi, China.

Plans are being considered for removing the Waalhaven Airport, Rotterdam, Holland, to a point about half way between that city and The Hague.

A contribution of $2,000 to the Graf Zeppelin proposed Polar flight has been made by the Government of Spain.

Under new regulations, students entering the Military School of Applied Aeronautics, Mexico City, must be under 30 years of age if they hold the rank of captain, and under 25 if lieutenants. They must be at least 5 ft. 7 in. tall.

Under special decree by President Portes Gil, a naval school of aviation for students of the Naval College will be established at Vera Cruz, Mexico. He has presented a plane to the new school.

During September 62 planes carrying 188 passengers landed at La Aurora Airport, Guatemala. Of these, 23 belonged to Pickwick Airways, Inc., and 22 to Cia. Mexicana de Aviacion.

Daily passenger service between San Juan, Ponce, Mayaguez and Arecibo, Porto Rico, was started about Nov. 1.

Pierre Chateauvieux, of France, has been engaged by the government of Colombia to head the country's aviation school at Madrid, near Bogota.

The Graf Zeppelin is undergoing complete overhaul at Friedrichshafen.

An all-metal monoplane with a wing span of 120 ft. weighing three tons and using three 600 hp. engines, designed to carry 28 passengers, made its first test flight recently at Merignac Airport near Bordeaux, France.

Officials of Deutsche Luft Hansa report that experimental flights have been satisfactory, and the company will start regular service on a Berlin-Constantinople line next spring. Arado monoplanes with "Hornet" engines will be used.

Offer French Safety Prizes

PARIS (FRANCE) — The Comité Français de Propagande Aéronautique has created for the three coming years four annual prizes attributed trimestrially and intended for the pilot in regular commission on French airlines who has covered the greatest distance without the slightest damage to the freight or injury to the passengers carried. Each prize is made up of a sum of $117, a medal and a diploma. The contest is to begin on Feb. 1, 1930. One prize goes to pilots in charge of night flying, another to flying boat pilots, and two to land plane pilots flying during daylight.

German Air Budget Is Drastically Reduced

BERLIN (GERMANY) — Drastic reductions amounting to almost 50 per cent and totalling about $6,380,000 were made in the proposed budget items of government aid to aeronautics. The most important single item was a cut of nearly five million dollars in the appropriation for scientific developments, subsidy to Deutsche Luft Hansa, and aerostation. The final amount to be devoted to these three fields is $4,595,970.

Approximate final figures for other major items are as follows: safety development, including radio stations, $426,000; meteorological services, $305,000; training of personnel, $478,000; special researches, $172,080; glider development, $72,000; night lighting, $79,000. The last-named appropriation will be applied to improving the Berlin-Konigsberg and Berlin-Hanover routes as well as to lighting others such as Berlin-Halle/Leipzig.

The budget as originally proposed was substantially similar to that for 1928, and the cuts accordingly represent a decided reduction in the government's proposed aviation activities. Aside from those already mentioned, the only important changes from the 1928 appropriations are a cut of 90 per cent in the amount for furtherance of airports, of 50 per cent in the amount for propaganda, and increases in the items for safety (including airport radio), lighting, and flying radio equipment.

Honor Early French Pilot

PARIS (FRANCE) — On Nov. 4, the Aéro-Club de France organized a banquiet in the honor of Marquis de Lambert, to commemorate the twentieth anniversary of his flight above Paris, on Oct. 18, 1909. It was the first time that an airplane had flown over the city. The Marquis, who was taking part in the first big air meet organized near Paris, at Port Aviation (Juvisy flying field, now abandoned), took off with his Wright biplane, climbing to a height incredible for the time (some 1,900 ft.) and heading directly in the direction of the Eiffel Tower. He circled round it, to the astonishment of the onlookers and returned to Juvisy in the midst of immense enthusiasm.

Luft Hansa Enlarges 1929-30 Winter Schedule

BERLIN (GERMANY)—Winter schedule of Deutsche Luft Hansa, in effect from Nov. 1, 1929 to Feb. 28, 1930, covers 7,250 mi., as compared with about five thousand in 1928-29, according to the report received by United States Department of Commerce representative here. Fourteen routes will be flown regularly, including the following: Berlin-Dresden-Prague-Vienna; Berlin-Hamburg-Lusbeck-Travemünde-Copenhagen-Malmö; Berlin-Hannover-Cologne-Brussels-Paris; Berlin-Hannover-Amsterdam-London.

The new Basel-Geneva-Marseilles-Barcelona route will be flown thrice weekly in each direction, with optional rail connection from Basel to Stuttgart. Luft Hansa will use three-engined planes on all major routes, and has others available for special services to points which may be cut off by suspension of rail or steamship routes. Foreign lines pass through Germany over the following routes which will be continued during the winter: Paris-Strasburg-Nuremburg-Fürth-Prague-Warsaw; Brussels - Antwerp-Dusseldorf-Essen, Mülheim-Bremen-Hamburg; London-Brussels-Dusseldorf-Essen, Mülheim.

Boykow Gets Patent For Automatic Control

BERLIN (CERMANY)—Patent has been granted here for an automatic airplane control device developed by Captain Boykow and manufactured by Messgeraete Boykow G.m.b. Double gyroscopes, mounted in a single inertia frame, are said to give diagonal as well as lateral and longitudinal control. The device can be set to hold the plane in straight, level flight, in three types of curves, or at a steady inclination of ascent or descent.

The principle of operation consists in a setting of the gyroscopes which allows them to precess in one plane only, although the gyroscope controlling the rudder is attached to an eccentric weight in such a manner that it will be caused to precess by a drift of the plane to the side, as well as by deviation from a straight line of flight. Connections between the altimeter and air speed indicator also actuate the gyroscopes if the plane gains or loses altitude or air speed. Control of the plane by the two gyroscopes is through relays and servo mechanisms.

Aeropostale Receipts Gain

PARIS (FRANCE) — During the first nine months of this year the Compagnie Generale Aeropostale's receipts totalled $437,436 as compared with $280,171 for the same period of 1928. However, the company reported a net profit at a recent annual meeting of $21,884, for the previous operating period. This was slightly under the net profit reported in 1928. Capitalization is to be doubled.

WHAT OUR *Readers Say*

Airport Versus Airfield

TO THE EDITOR:

It's high time that a very sharp line of demarcation be drawn between an *airport* and an *airfield.*

An *airport* is a flying field adapted to and used by air transportation, and practically confined to air transportation.

An *airfield* is a flying field from which miscellaneous flying can take place.

Both fields must be safe and adequate for their respective uses, to be sure, but beyond that they may differ very materially in their characteristics.

First and foremost, it seems to me, the difference between the two lies in the relation to the populated area of the community served. In the case of the airport, close-iness (if I may coin the word) is a matter of paramount importance. An airport fails as an airport if it is not close enough in to the center of the community to enable air transportation to operate therefrom economically.

The airport is practically the air depot of the community and who would think of putting the railroad depot miles from the center of town unless absolutely necessary?

Take two glaring examples of this out here on the Pacific coast.

Politicians, or a group of men who did not know anything about air transportation, put the municipal airport (so they called it!) of Los Angeles in Inglewood, fourteen miles from the center of the city. Result: Not one airline uses the field as a terminal, in spite of the fact that Mine's Field, as the Inglewood field is called, is aeronautically nearly perfect. *All* of the air transport lines, practically, operate from Glendale's Grand Central Air Terminal because it is much closer in to the city. And the Glendale field is far from perfect, aeronautically. But it is adequate for the purpose, although less than fifty acres in area.

Likewise in the case of San Francisco. They put their municipal field in the town, or settlement, of San Bruno, about fourteen miles out from the center of town. Not one airline uses it as a terminal. They all use Alameda or Oakland.

Whatever any municipality may call its field, it is not an airport unless it is close enough in to be used by the big air transport lines.

Many communities are learning this but only after spending hundreds of thousands of the tax-payers' money on locations too far removed from town.

I was talking with the president of one of the big airlines out here the other day, and he said that land transportation was a very big factor in their operating costs, not to mention the time required to get to and from the airport.

The airfield, on the other hand, preferably should not be close-in. It is nothing in a student's young life how far he goes to be taught to handle the joy stick. He can just as well go fourteen miles as five or two.

Neither is it a matter of importance how far the private owner must go to get his ship.

But when a big air liner comes in, it is a matter of paramount importance as to how far the passengers must go to get to the city they are visiting. In this case its a matter of dollars and cents to the passengers and to the operators of the airline in question. In fact, so far as the passengers are concerned, it is often a matter as to whether they will take the air route or not in going to a certain town. If they have to spend too much time going to and from the airport, they will take other means of transportation.

Will Rogers keeps emphasizing that important fact in his helpful remarks on aviation.

Another point. In the case of the airport, runways are of primary importance; great area is not a necessity. Runways must be adequate for air transport work but a large area for repair shops, private hangars, etc., is not required.

On the contrary, in the case of the airfield, area is of importance. There must be space for shops, private hangars, etc.

Sooner or later, as aerial transportation comes more and more into general use, a city will have one or more close-in airports, with more and more airfields in the outlying districts as the demand for airfield facilities increases.

I'm fighting this situation right here in Santa Barbara. Politicians, and men who have property to sell to the city, are trying to put the airport of the city in the adjoining town. The property chosen is nine miles from the post office. There is another piece of property only two miles from the post office. Whatever action taken by the city, it is obvious that the air transport lines will not go nine miles from the city if they can land their passengers two miles from the business center. But probably this will not be realized by the city fathers until it is too late.

Let us consider, for a moment, the terrain surrounding the two classes of landing areas I am discussing.

In the case of the airport, the ships using the field will be operated by expert transport pilots. And in most cases the ships will be multi-motored. The chance of an accident in coming into port, or in taking off, will be reduced to the minimum. There is no reason, therefore, why the entire country surrounding the airport should be adapted for emergency landings.

With the airfield, on the contrary, it is different. Students should be taught from a field far enough removed from dwellings and business buildings so that an emergency landing will not endanger others.

Assuming that an airport were chosen close enough in for the purpose, and surrounded by nothing but cow pastures. It would only be a question of time when the surrounding country would be built up.

In other words, this idea that an airport must be surrounded by safe emergency landing fields is nonsense, and the sooner the various communities realize this the better off they will be. And the more air transportation they will get.

And I take this occasion to make a prediction: It is only a question of time, and a short time at that, when the Department of Commerce will make a ruling that there shall be no student instruction from an airport used by schedule airline operation.

No person who knows the risk he runs will want to take off, or land upon a field knowing that there are students in the vicinity who are up for their solo flight.

Must we wait until a student crashes into a loaded air liner to have this generally realized?

To sum up:

An *airport* must be close in if the community served is to benefit to the maximum by air transportation. And sooner or later an airport must be confined to air transportation and the use of pilots who know how to fly.

An *airfield* should preferably be in an outlying district where the inexperienced pilots who fly therefrom endanger only their own lives.

In other words, the line of demarcation between the airport and the airfield should be very closely drawn and the Department of Commerce should differentiate sharply between the two classes of landing fields.

EARLE OVINGTON,
Santa Barbara, Calif.

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"Remote Indicating Compass"

TO THE EDITOR:

On page 846 of your issue of October 26, there is an article by John T Nevill, Detroit editor, entitled "With the National Air Tour" in which the following statement occurred.

"Only two earth inductors made the tour on competing ships, those being fitted to George Haldeman's Bellanca and Mr. Zeller's Ford."

This refers to compasses of the remote indicating type. Actually the

compass on Mr. Haldeman's Bellanca was an earth inductor manufactured by the Pioneer Instrument Company, but the compass on Mr. Zeller's Ford was a Magneto Compass manufactured by the General Electric Company. It is not correct to call the Magneto Compass an earth inductor. "Earth Inductor" is the name which the Pioneer Company call their compass. "Magneto Compass" is the name we give ours. The general term for both, however, is remote indicating compass.

A similar misleading statement is made in the first paragraph of the second half of page 846 of this publication in which reference is made to "earth induction type," instead of "remote indicating type."

We shall appreciate your making some correction of this misunderstanding.

A. H. FRENCH
Industrial Department
General Electric Co.
Schenectady, N. Y.

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Dual Controls and Joy-hopping

TO THE EDITOR:

I am not in any way connected with aviation, but have a great interest in it.

I am merely a farmer and have never flown but twice and those were joy-hops. I have a question or two I would like to put before you. What are the Dept. of Com. rules concerning passenger-carrying in a plane built to carry two besides the pilot?

I had a man offer to carry me and my two small sons the other day and about a year ago I was refused this because the pilot said it was against the law. Also aren't the controls supposed to be disconnected when they are dual for joy-hops?

I rode in a ship recently that had throttle connected in front cockpit and it seems to me that a practice like that is risky, especially if he had a person who was easily scared. It might get him in a jam.

GORDON RATCLIFF,
Hillsboro, Ind.

[The Department of Commerce rules provide that controls in the passenger cockpit shall in all cases be disconnected when carrying passengers for hire. It occasionally becomes evident that some pilots have never heard of the rule, or have misunderstood its scope. The question of throttle control specifically raised by Mr. Ratcliff is an important one, and is not separately covered in the regulations. Undoubtedly some accidents have been due to a passenger inadvertently closing the throttle at a critical moment, just after the take-off. The present Department of Commerce regulations might easily be interpreted to include the throttle control as one that must be covered or otherwise protected from accidental manipulation by a passenger. Clearly it should be so included. —ED.]

Slots on the Handley-Page

TO THE EDITOR:

We have read with interest in AVIATION dated the 19th of October, 1929, an account of the entries for the Daniel Guggenheim Safe-Aircraft Competition, particularly those remarks devoted to our own entry and would like to offer the following comments:

We notice that you mention that the slots near the tips of the upper plane in front of the ailerons operate automatically. This is correct. But you go on to say that, "Over the remaining parts of the upper wing, however, and over the entire lower span, the slot is *manually controlled* by the pilot, and a flap along the trailing edge operates in conjunction with the auxiliary airfoil, the flap coming down as the slot is opened." This is *not* the case.

All the slots on our Guggenheim entry are entirely automatic and are in no way controlled by the pilot. The rear flap is linked to the auxiliary aerofoil, and when the machine assumes what would normally be a stalled attitude the slots open of themselves, automatically, drawing the flaps down and thereby increasing the lift over the planes at a time when normally the greater part of the lift would be absent.

We are sure that with the excellent reputation for accuracy which you enjoy you would not like such a fundamental error to appear unnoticed and feel certain that we have only to make the suggestion for you to give the same publicity to a correction as has now been given to the inaccuracy itself.

T. H. ENGLAND,
Handley Page, Ltd.,
London, England.

[The author of the article referred to in the issue of October 19 was obliged to depend upon observation of the externals of the Guggenheim Contest plane in preparing his description, as at that time no detailed accounts had been released to the press. The error pointed out by the Handley Page firm resulting from a more detailed account of the proportions and the operation of the Handley Page machine than others in the competition appeared in AVIATION for October 19, and there will be additional data of the same sort in subsequent issues.—ED.]

Editorial Comment
FROM THE DAILY PRESS

4,850-Mile Non-Stop Flight

REMEMBRANCE of other flights with divers stops across Siberia and the difficulties of even the Graf Zeppelin, starting farther East than Paris, made it seem at first that there must be some mistake about the report that Dieudonne Costes, in a flight from the French capital, had landed in Manchuria. The endurance record was made here, with refueling, under the conditions of a single locality, but this long-distance exploit was achieved in face of many variations in weather and topography. The distance is conservatively computed at not less than 4,850 miles, more than a fifth of the circumference of the earth.

The ever-mounting record in non-stop plane movement was 4,448 miles in 1928, the distance from Rome to Brazil, made in the Ferrarin-Delprete flight, and prior to that, 3,911 miles, across the Atlantic, made by Chamberlin and Levine, Lindbergh's famous exploit being a short time before. Technical fault-finding with Coste is done by the Soviet authorities, but are not even past ideas as to the dependability and general utility of planes much fortified when a man can rise in Paris and descend on the remote confines of Eastern Asia?

This M. Coste is the man who once crossed from Paris to South America, came up over the jungles of that continent to New Orleans, visited many of the cities and landing fields of this country and later made flights that took him westward from Tokyo to Europe. When the roll of aviators of surpassing accomplishments is called, his name must have the foremost place today, though a different name may be substituted tomorrow, so swiftly do the throng of air heroes pass and repass and outstrip one another on the aviation panorama.—ST. LOUIS GLOBE-DEMOCRAT.

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A Contribution to Aviation

THOSE WHO look askance at the records for safety in the sky and prefer instead to let their minds dwell on crashes and crack-ups are urged to scan the career of one E. Hamilton Lee, an air mail pilot out of the Chicago district. The other night Pilot Lee completed one and a quarter million miles in the air and he is being appropriately feted by his fellow airmen. Flying for sixteen years Lee has never had a serious accident and that with nearly thirteen thousand hours aloft.

It is a far cry from records like this to foolhardy flying that discourages public confidence in aviation.

Compare an aggregate mileage of safe flying of sixty times around the world to the aviator who ignominiously crashes in an endeavor to get his overloaded plane off the ground to establish a spectacular but dangerous record. May we have more flyers like Lee, who contribute to public confidence, and fewer who promote public dismay!—WASHINGTON STAR.

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Stunts and an Airminded Public

[The following comments from *The Sportsman* seem sufficiently interesting to find a place on the page ordinarily devoted to newspaper editorials].

THOSE who saw the national air races at Cleveland have come home greatly impressed with the wonderful exhibitions of speed and skill shown there. The service planes flying in formation, the races themselves, and perhaps above all the stunt flying tremendously impressed the great throngs which were present every day. It is doubtful, however, if stunt flying, spectacular as it is and useful in its way, is the best method of making the public air-minded. On this point the editor of AVIATION speaks out loud and clear. He says:

> The spectacle was one which had absolutely no place at the National Air Races, and we hope that it will never again be seen there.
>
> As a demonstration of the capacities of an airplane for the benefit of a prospective purchaser who is already a pilot and is well acquainted with the general behavior of aircraft in flight, acrobatic flying has much to recommend it. It is a proper part of any such demonstration of a light sport machine designed to stand rough handling. As a demonstration of the usefulness of aviation and the general capabilities of aircraft before a crowd 99 per cent of whom are not pilots and a majority of whom probably never have even flown as passengers, it rates below absolute zero. When a string of outside loops is made, those who fly themselves may understand and admire, but each succeeding inverted flip-flop adds to the number of lay spectators who solemnly resolve that they will take all their aviation henceforth at second hand and at a safe distance. "If that sort of thing is a part of flying, . . . instinct tells me that it cannot be much fun."

From the standpoint of those interested in the airplane industry, these are words of wisdom. Watching a plane falling like a leaf or roaring around an outside loop would never make a quiet home body like me yearn to be a pilot and to own a plane! I would rather, like the old lady in *Punch*, stick to the old-fashioned railroad train, "as nature intended us to do." But no one can deny that stunting provides a most thrilling and exciting spectacle and that the crowd enjoys it almost to the point of pain. Poor propaganda, perhaps, but something to see and wonder at.

THE SPORTSMAN.

New Volumes
FOR THE SHELVES

Progress of British Research

ANNUAL REPORT OF THE BRITISH AERONAUTICAL RESEARCH COMMITTEE FOR 1928-9. His Majesty's Stationery Office, *London, England, Oct.,* 1929; 2/0; 63 pages.

Similar to the annual reports of the National Advisory Committee for Aeronautics in that, while administrative, it is concerned mainly with abstracts and progress reports of research projects, the Annual Report of the British Aeronautical Research Committee offers a brief résumé of the additions to aeronautical knowledge completed and pending under the committee's direction. The report proper covers only eighteen pages, containing little general matter, starting after one line of introduction at once to discuss briefly the larger problems and accomplishments. Further information is contained in the supplement of some 29 pages.

Like the N.A.C.A., the British Committee has a main committee together with various sub-committees and panels, the latter being perhaps temporary sub-sub-committees, though often covering part of the duties of several sub-committees. The men forming these various minor sections seem to be more intimately connected with the actual conduct of research than in the N.A.C.A. sub-committees.

In the annual report, there is included a list of publications, all "Reports and Memoranda," called "R. & M.'s," issued during the year. This list is grouped by subjects in accordance with standard subdivisions. There are only twelve and they are thoroughly logical ones. The R. & M.'s far outnumber the total of Technical Reports and Technical Notes issued by the N.A.C.A. in a year, some 80 odd of the first against only 56 for the latter two combined (1928 Annual Report).

When regarding the problems and their treatment discussed in the supplement, we cannot but feel ashamed of American lack of progress in some phases, but cannot refrain from a degree of pride in other developments. The N.A.C.A. is indeed to be congratulated that the A.R.C. has decided to build a 6-ft. compressed air tunnel, is considering a 24-ft. open throat propeller, cowling, and cooling research tunnel, and has projected a special high speed model basin. Extensive compression-ignition engine research has not yet developed in England to as practical a stage as that evidenced by the Packard Diesel. But in such fields as control in stalled flight, use of slots, etc., flutter of wings, high speed sleeve-valve engine development (both gasoline and Diesel) and especially mathematical-aerodynamics and fluid flow, the comparative superiority of the British work is marked.

There follow a few of the important results either reported or in progress. Only those strictly aeronautical in nature are included:

Scale effect on drags of streamline bodies partially overcome by making the tunnel excessively turbulent.

The Townend Ring cowling, similar in effect to, but more simple than the N.A.C.A. aircooled engine cowling.

Loss of efficiency of propellers at high tip speed measured by their symmetrical sections.

Boundary layer investigations around cylinders, ovals, and airfoils.

A method whereby the critical speed in flutter of a monoplane may be predicted from model experiments.

A small high speed single-sleeve engine, giving a B.M.E.P. of 140 lb. at 5,000 r.p.m. without dope, benzol, or supercharging.

The variable compression engine as the most suitable "knock rating" measurer of fuels.—SHOTSWELL OBER.

• • •

Two Polar Flights

AIR PIONEERING IN THE ARCTIC. *The Two Polar Flights of Amundsen and Ellsworth; National Americana Society; New York;* 1929; $25.00.

NO MONUMENT of stone or bronze could ever be raised in Norway or the United States which would serve as a more fitting memorial to the heroic efforts and spendid achievements of these two expeditions than does this beautiful book.

One hesitates to plunge into a description of the volume, as an example of modern de luxe publishing, for fear of running out of superlatives. It is large and attractively bound, the paper and printing are a delight to the eye and the process of photogravure used for reproducing the many excellent photographs is the most beautiful I have yet seen. As a possession which would give endless pleasure to any one with a real interest in aviation, polar exploring, geography, heroism or adventure, I can highly endorse it. As a gift book to any of the above listed people it could not be surpassed.

The subject matter is not new. After each flight a book was written under the joint authorship of Amundsen, Ellsworth and other members of the expedition and published in this country—"Our Polar Flight," Dodd Mead & Co., 1925, and "First Crossing of the Polar Sea," Geo. H. Doran, 1927. Good books they were too, complete in narrative, well illustrated,

and with a fair amount of technical detail. The present text is reproduced almost verbatim from the earlier books. There has been some cutting down of narrative, generally where there was an overlapping by the several authors, and there has been added a tribute to Amundsen by Ellsworth and a summing up of results quoted from a speech to Congress by the Hon. Roy O. Woodruff, but there is no new narrative, scientific data, or general discussion of the place of the expeditions in the history of polar travel. It is perhaps unfortunate that there is not some such enlargement which would have given this edition a standing of its own as an original record, but there are many photographs which did not appear in the earlier volumes, together with most of those which did.

Mr. Ellsworth and the National Americana Society are indeed to be complimented on their efforts.—DANIEL C. SAYRE.

• • •

Handbook for Welders

THE OXY - ACETYLENE WELDER'S HANDBOOK, *By M. S. Hendricks; The Acetylene Journal Publishing Co., Chicago, 1929; 208 pages.*

CONSIDERING the obvious limitations inherent in an effort to describe by detail word pictures an art which is so much more naturally conveyed by actual physical demonstration to an operator, the author has done a commendable job. Covering the all inclusive field of oxy-acetylene welding as applied to all materials and in all industries, involves an interrelationship of description, that may at times be a little confusing, in that for the lesser used materials, the differences, rather than the complete operations, are cited.

While there are such headings as "Aircraft Welding, Chrome Molybdenum Steel, Aluminum, etc.," in the book, these are merely treated in a very general way, and in no sense may these subjects be regarded as providing the proper basis for instruction of an aircraft welder. The dependence of good welding upon proper part design, taking due cognizance of both the possibilities and limitations of oxy-acetylene welding in aircraft applications, is not brought out at all. Bearing in mind that many aircraft production managers find it easier to make aircraft welders out of inexperienced raw material than to try to convert expert welders in other industries into aircraft welders, the value of the book to the aircraft industry becomes highly questionable.

Only in so far as a full statement of basic principles, methods of manipulation and causes for poor welds in other fields provides a background in which to search and discover a cause for unsatisfactory work in aircraft welding, does the book attain a primary value to the aircraft industry. This, coupled with chapters on welding equipment and the setting up of equipment, is undoubtedly valuable as a safety check to the aircraft welding supervisor, though it is not believed that the book as a whole is particularly adaptable for use by the aircraft welding operators themselves.

A secondary value to the aircraft industry doubtless lies in the utility of the book as a repair manual for plant equipment. The instructions with respect to the procedure, and more particularly the preparation of general machine parts made of various materials which have broken in service and are subject to repair by welding, is particularly good. In fact, it is only in the plant equipment or maintenance department of an aircraft factory that this book may possibly attain the usefulness it clearly has in the oxy-acetylene industry in general.—JOHN F. HARDECKER.

Abstracts AND *Reviews*

An Aviation Survey

A TALK ON AVIATION, *by Harvey L. Williams, president, Air Investors, Inc.; delivered to the Executives Club of the Boston Chamber of Commerce, Oct. 8, 1929; published by Air Investors, Inc.*

AVIATION STATISTICS, *prepared for Executives Club of the Boston Chamber of Commerce; published by Air Investors, Inc.*

AFTER a brief historical summary, Mr. Williams' talk is devoted entirely to a general consideration of the condition and prospects of the aviation industry in America, particularly on the basis of the figures published in the accompanying pamphlet. Under separate headings, a rapid survey of the different types of commercial aeronautics is given. Most of this material is familiar to those who are directly connected with aviation, but the selection and organization of the material deserves praise.

Production statistics, numbers of planes and pilots, manufacturers and types, engines, and lighter-than-air craft all are taken up. They are followed by an outline of Department of Commerce activities, air transport, school and taxi operations, and a largely statistical discussion of private flying. Finally, the cost of air transport is examined, and a considerable space devoted to the question of the safety of flying.

Particularly interesting, of course, is Mr. Williams' discussion of the financial status of the industry. He estimates that the public valuation of all the companies is about $1,000,000,000. An analysis of all possible sources of revenue gives $100,000,000 as a generous estimate of the gross, indicating an obvious impossibility of providing a reasonable returns on the gross investment. On the other hand, a large proportion of this capitalization represents the erection of facilities and experimental work which was not expected to produce very much income for several years to come. A number of the established companies, particularly those operating on air mail contracts, are already giving a very fair return on their capitalization. Mr. Williams feels very definitely that, barring the process of weeding out weaker companies which must take place in any new industry, the financial condition of aviation is entirely sound.

Recent stock offerings by aviation companies are summarized on two pages of the booklet on "Aviation Statistics." During the year ending Aug. 31, 1929, 82 companies offered securities valued at $248,200,000 to the public. Forty-three per cent, or $108,235,000 worth of these securities were offered by The Aviation Corporation, United Aircraft & Transport Corporation, Curtiss-Wright Corporation, or companies which have since joined these three groups. With Bendix Aviation Corporation added, they accounted for $532,846,000 of the $727,336,000 total market value of securities listed on the New York Stock and Curb Exchanges, Sept. 30, 1929.

It is pleasant to note that the presentation of statistics is impartial, and that Mr. Williams' talk nowhere spills over into ill-considered optimism of the type generally associated with investment and promotion activities. The facts are presented as accurately as they have been determined, including a number calculated to dampen the over-enthusiasm of some parts of the public, and are allowed to speak for themselves. No conclusion is stated; the facts indicate concrete possibilities of wide expansion for the industry, but seem to suggest the need for some caution in the immediate present. On the whole, the outlook is decidedly favorable.

• • •

Stocks and the Industry

AVIATION IS FUNDAMENTALLY SOUND, *by Archibald Black, in Commerce and Finance, November 6, 1929.*

WE ARE PLEASED to note Mr. Black's discussion of the relationship of aviation stock quotations to the actual status of the industry itself. Within the industry few are self-deceived by the depressing appearances, unless it be the under-financed

and poorly organized manufacturer or airline operator who well knows that a declining market reflects his true state. Mr. Black shows why the substantial citizens of the industry are not disturbed by these erratic conditions.

The substance of a mild rebuke which he administers the manufacturers is contained in his pointed remark that building aircraft is not the aviation industry but merely a branch of it. He tempers his scolding by pointing out the fact that all through the industry such errors as comparing it with the automobile business on one hand and the railroads in another, are being committed.

The major sins of the manufacturers, according to Mr. Black, are the tendency of some to stick so closely to production charts that they lose the essential perspective toward the industry as a whole; the extending of production without increasing sales as though the two are not inseparable; poor judgment in assuming that because the bulk of the automobile production is absorbed by private users the same is true in plane manufacture; the ignoring of seasonal factors when charting production and anticipating sales; and a general disposition to consider factory and production problems rather than general conditions.

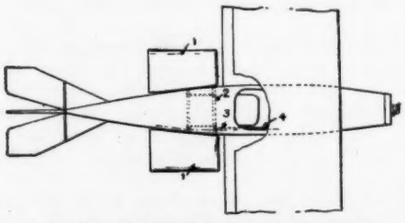
Viewed from one angle these are serious indictments, but as has been said, Mr. Black offers substantial encouragement in the form of graphs showing a decidedly healthy state when the field as a whole is considered. The high ratio of student pilot applications to plane production figures and their obvious relationship; the steady increase in airmail and passenger volume, and a strong inclination toward stabilization within every department of the industry are the backbone of his argument for optimism.

New Patents

Auxiliary Wings

1,734,114. AEROPLANE. JAMES G. CONNOR, Harrisburg, Pa., assignor of one-third to Harry L. Reynolds and one-sixth to S. T. Hurlock, Jr., Harrisburg, Pa. Filed Nov. 26, 1928. Serial No. 322,076. 6 Claims. (Cl. 244—12.)

AUXILIARY AEROPLANE WINGS. A pair of wings pivoted on a horizontal axis, similar to the elevators, is provided behind the fixed wings, with the



The illustration shows the auxiliary wings 1, pivotal axis 2, and pilot's connection 3 and 4

object of facilitating landing and preventing nose-dives. The auxiliary wings are designed to be operated by the pilot through a mechanical connection.

Hangar for Dirigibles

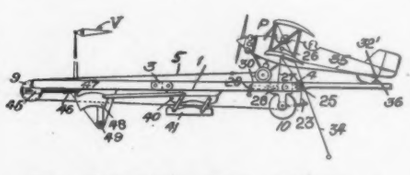
1,734,812. APPARATUS FOR LANDING AIRSHIPS. OTTO KRELL, Berlin-Dahlem, Germany. Filed July 16, 1926. Serial No. 122,995, and in Germany Aug. 14, 1925. 3 Claims. (Cl. 244—2.)

A HANGAR is provided at its open end with a mooring mast. The point of attachment of the dirigible to the mast may be lowered by means of cables until the craft is in position to pass into the hangar. A cable with ballast bodies fixed to it throughout its length is provided for attachment to the rear end of the craft.

Launching Device

1,734,353. AUTOMATIC LAUNCHING DEVICE FOR AIRPLANES. ELMER E. SPERRY, Brooklyn, N. Y., assignor to Sperry Development Company, Dover, Del., a Corporation of Delaware. Filed Nov. 25, 1927. Serial No. 235,519. 12 Claims. (Cl. 244—2.)

THE DEVICE is designed to place the launching operation under the control of the pilot in the plane. It is intended to permit a pilot, by pulling upon a ring connected to cables, to release disappearing chocks under the wheels, withdraw pins at the ends of cables which fasten the wings and tail to the ground or deck of a ship, and throw in a clutch which connects a motor and



The illustration shows platform 1, launching cable 5, pulley 10, ring 26, pin-releasing cables 34, tail-releasing cables 36, clutch-operating cable 23, trip 46-49, and brake 40, 41

pulley to the launching cable attached to the plane. The pulley is a modified cone shape so that an increasing acceleration may be given to the launching cable and the plane. The launching cable is attached to hooks on the plane designed to permit the cable to slip off as the plane is launched. When the launching cable is released, the tension is also released, and the slackening is designed to trip a brake for clamping the cable against further winding by the motor and pulley.

Helicopter Attachment

1,734,263. HELICOPTER. FRANK B. MANY, Cleveland, Ohio. Filed Nov. 23, 1925. Serial No. 70,957. 4 Claims. (Cl. 244—15.)

HELICOPTER ATTACHMENT for airplane. A helicopter propeller is driven by a motor-generator set similar to that used in automobiles. In ascending, the motor-generator is clutched to the helicopter. When the desired height is reached, the motor-generator set may be unclutched from the helicopter and clutched to the gasoline engine which drives the ordinary propeller, to act as a starter for the engine. After the engine has started, it charges the motor-generator set. The pilot may lower the helicopter propeller, when not in use, into the stream line of the wing by operating a lever.

Propelling and Steering Device

1,734,251. AERO PROPELLING AND STEERING MEANS. MAURICE GALLET, Poughkeepsie, N. Y. Filed Nov. 16, 1928. Serial No. 319,771. 2 Claims. (Cl. 244—18.)

HOLLOW TUBES, each having a propeller at one end, are provided for forward and reverse movement. The tubes are pivoted on the craft so that they may be tilted in one direction or the other for the purpose of assisting landing or ascent. Similar tubes and propellers, in transverse position, are provided for turning the craft.

Airplane Wing

1,734,801. AEROPLANE WING. HEINRICH FREISE, Bochum, Germany. Filed Aug. 5, 1927. Serial No. 210,949, and in Germany Aug. 6, 1926. 9 Claims. (Cl. 244—12.)

THE FRONT FACE of an aeroplane wing is provided with several pivoted air-inlets, leading into the interior of the wing, and mechanically connected to the elevators to keep the inlets horizontal. During flight, the inlets are designed to supply air under pressure through a series of slots to the under side of the wing's upper surface which is formed of a series of "jalousie" blades. It is claimed that in addition to the positive pressure thus obtained, the air issues from the blades with sufficient pressure to increase the suction on the wing's upper surface. A flap in each inlet, with a mechanical control leading to the cock-pit, is provided for enabling the pilot to control the amount of air entering the wing.

THE BUYER'S LOG BOOK

Sperry Arc Floodlight

IN RESPONSE to the demand for a high intensity arc floodlight unit for major airports, the Sperry Gyroscope Company, Inc., Brooklyn, New York, has designed a 1,000 millimeter, 180 deg. dioptric, automatic floodlight. The lens is mounted in a brass chromium plated frame and built in a housing constructed of silicon-aluminum alloy to obtain rigidity and permanence as well as light weight. The lamp mechanism is the two unit type, with the lamp heads holding the positive and negative carbons mounted inside of the drum and the operating mechanism on the outside where the operating temperature is lower. In order to keep the positive carbon in accurate focus, insuring maximum candlepower, it is necessary to use a full automatic lamp mechanism. One pair of carbons will burn for a period of two hours without recarboning.

Mounted in the top of the drum is a motor driven ventilating system for exhausting fumes and carbon

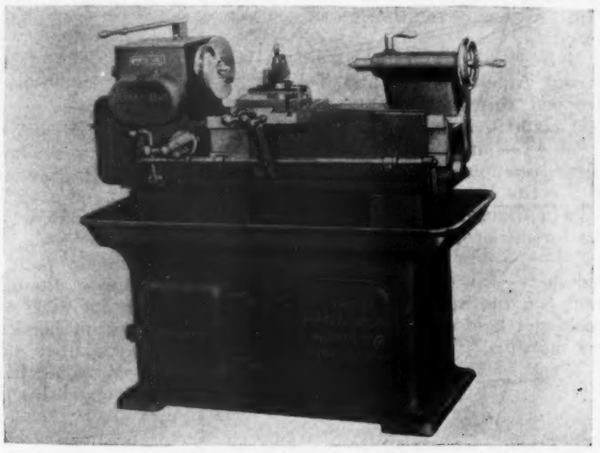
The Sperry type AGA arc floodlight installed at Roosevelt Field.

A portion of Roosevelt Field illuminated by the above floodlight

particles which might be deposited on the inside of the lens. Two large doors in the rear of the drum permit access to the interior of the floodlight. The operating mechanism, the meter and switch panel, however, are mounted on the outside of the drum. Since the mechanism is automatic, the floodlight may be turned on remotely from the operating office.

Porter-Cable Carbo-Lathe

THE Porter-Cable Machine Company, Syracuse, New York is offering a new production lathe known as the carbo-lathe especially designed to take care of short pieces not over 18 in. in length and 7 in. in diameter. It is also adapted for secondary operations on screw machine parts, such as pistons, forgings, turning pinions, blanking of gears, bronze or iron bushings, shafts, and piston rings. The head stock and bed are one casting of chrome nickel iron to obtain rigidity. The tail stock is of heavy one piece construction and clamped to the bed by two draw bolts on heavy gib, its arrangement permitting free travel of the carriage underneath the tail spindle. The centers used are No. 3 Morse



The new Porter-Cable Lathe

Taper relieved in center so that a two point contact results. The spindle height from the floor is 42 in. and the highest part of the machine 48 in.

Power is furnished by a motor of 3 or 5 hp. in the cabinet base. The motor is mounted on a hinge plate, the weight of the motor being sufficient to take up the slack in a flat belt that drives the clutch pulley. The control lever that operates the clutch also applies the brake that stops the spindle. Power is transmitted to the spindle through spiral and worm gears while the feed is driven by spur and worm gears.

The lathe is furnished with a motor of 1,750 r.p.m., a 6 in. motor pulley, and an 8 in. drive shaft pulley, having a maximum spindle speed of 1,500 r.p.m. and a minimum of 42 r.p.m. Spindle change feed gears give a ratio from 9.1 to 1 maximum to 1.75 to 1 minimum between clutch shaft and spindle. Carriage feed gears are also standard equipment. The construction of the bed is such that lubricant falls through the center which is hollow.

"Kant Slip" Plier

THE "Kant Slip" plier is a drop-forged tool made of chrome vanadium steel and recently introduced by the Kant Slip Plier and Tool Company, 6036-38 Wentworth Avenue, Chicago, Illinois. Round, square, or hexagonal nuts or objects of other shapes can be gripped by this tool, the adjustment being automatic and instantaneous. It grips with a slight pressure and releases instantly. The teeth are accurately machined and handles are shaped to fit the hand.

SIDE SLIPS

By
Robert R. Osborn

WE WANDERED OUT to Mitchel Field the first day of the official testing of the ships entered in the Guggenheim Safe Aircraft Competition. A large crowd was on hand and officials, judges and pilots were standing around in groups, talking excitedly. We hurried up to the largest group, containing a number of aeronautical celebrities, eager to hear the discussion on some of the entries. We heard:

"I tried all day yesterday to get rid of my American Tel and Tel but it dropped thirty-six points before the sale could get in."

"———— and I stood in that 'phone booth for four hours dropping coins in the slot but the operator said there were a thousand calls on the waiting list for my broker's office."

"———— but they all had the same sad story—'Surely, Bill, I'd be glad to lend you the money, but every cent I could get hold of is in there covering my margins."

• • •

We think that the winning ship in the Guggenheim Competition should be looked over very carefully to see if it has some devices which might be attached to the stock market—for, if we remember correctly, one of the requirements is that uncontrolled dives or spins shall not occur in ships meeting the competition rules.

• • •

Aerodynamicists who love to speculate on the characteristics of wings having infinite span will probably be horrified at reading the description of the new Dornier boat, as discovered in a New York paper by F. F. of Hempstead, N. Y.:

"The Do-X measures 150 feet from tip to tail. Its wings are 100 feet thick and fifteen feet from wing tip to wing tip."

• • •

Mr. H. I. Phillips is responsible for the following excellent comments appearing in the New York *Sun* on the German flying boat: "The German Dornier Do-X has made a flight with 169 passengers and what tourists live in dread of is the news that there was a ship concert." "There will, of course, be a popular song calling the Dornier the 'Do-de-do-do-do-X.' "

• • •

"MISSOURI FLYER REACHES TO 100 FEET UNOFFICIALLY"

So reads the headline of an item found by an anonymous contributor, in the St. Louis *Star*.

Well, we've been surprised to see some ships get off at all.

• • •

There was an item in the papers a week or so ago, about a Navy parachute jumper who jumped over Narragansett Bay, inflated a rubber boat as he fell, and after landing paddled over to a submarine which took him on board.

Someone with a remarkable sense of humor thought up the question which one finds on most life insurance application blanks: "Do you engage in aeronautics or submarine work?" and we should like to have been present to watch his expression as he read that news item.

• • •

From E. J. von H. of Chicago, Ill., comes a clipping from the New York *Sun*. The news item is a description of this year's air races at Cleveland and lists among the events of one day, "The airplane carrier Saratoga roared above the field." Mr. E. J. von H. suggests that an added feature of next year's races could be a little close formation work with the Lexington, but we'd much rather see Lieutenant Doolittle try an outside loop with either one of them.

• • •

Capt. F. C. A. reports that the California flyers are now working up the possibility of changing tail wheels in flight, as a novelty relief from their daily exercise of changing landing gears, overhauling motors, replacing ailerons in flight.

• • •

Mr. J. D. P. of Brooklyn, New York, sends in an article describing an airplane apparently designed after the specifications of the "Travelrock no-purpose all-concrete monoplane," described in AVIATION some time ago:

"An airplane convertible from a landplane to seaplane, and which will serve as a fighter or bomber, for reconnaisance, as an ambulance, for carrying passengers or for long range travel, is the latest production of an English airplane factory. The standard ———— is fitted with either a Napier 'Lion' series V engine, having a compression ratio of 5.8 to 1, or a Napier 'Lion' series XI with a 6 to 1 compression ratio, or with the new Rolls-Royce FXII, all of which are water-cooled engines; if an air-cooled engine is preferred, the Bristol 'Jupiter' series VIII is used. The normal fuel capacity is 124 gallons of gasoline, and the amount of oil which can be carried is nine gallons, giving a range at cruising speed of about 9,700 miles."

Our foreign agents report that this great versatility is made possible by a portable electric stove which this ship is carrying for the first time in history.

• • •

Mr. J. C. of Oakland, Cal., sends us a note clipped from the San Francisco *Chronicle* which shows the chances some pilots will take, and we think the matter should be reported to the Department of Commerce:

"———— the take-off was extremely hazardous, as it was necessary to fly almost directly across the field into the face of the wind."

• • •

The news tells of a Chicago woman who has just completed an 8,000 mile shopping trip, by airplane, during which she purchased gowns and accessories in Hollywood and New York. We wonder if the men who have been boosting aviation so enthusiastically in the last few years ever thought that the airplane would give their wives a wider shopping range?

• • •

Apparently some attempts are being made to develop mechanical Robots to serve as airplane pilots but that they are still far from perfect is evident from a clipping mailed in by R. J. D. of Wichita, Kansas:

"Hiawatha, Kan., Oct. 17.—Deane Kimmel, aviation enthusiast here, got "the thrill that comes once in a lifetime" when he figured in an airplane runaway. The pilot of the plane in which Kimmel was riding developed engine trouble and the pilot alighted to crank the engine."

"HAPPY LANDINGS!"

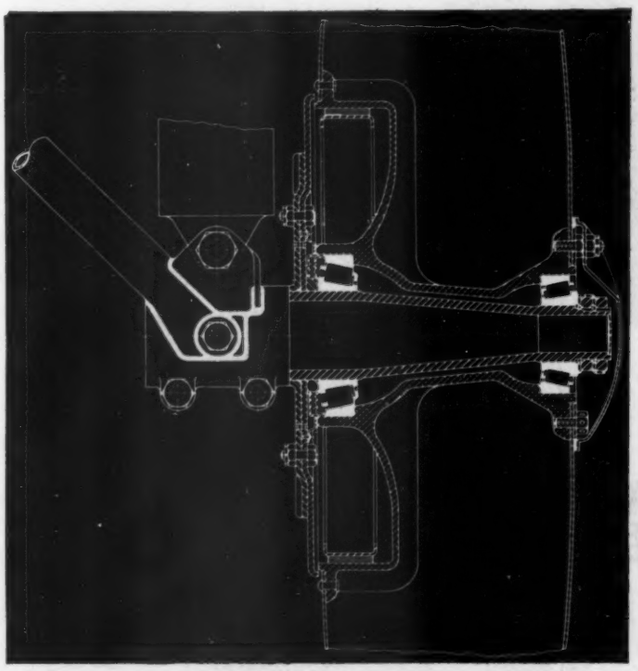
TIMKEN BEARING EQUIPPED

What man is there with more than a few hours of air-experience who has not heard that oft-repeated toast—"Happy Landings!" A relic of World War flying days whence it originated, the expression then was alive with meaning . . . for planes were far from perfect, and good landings were often merely the result of luck and skillful handling.

But the American public today is rapidly becoming air-minded. Safety, ease of handling, and low upkeep are demanded. To help meet these requirements, manufacturers are turning to Timken Bearings for landing wheel mountings.

Timkens' perfect concentricity makes even braking possible. Long service is assured—without the necessity of removing wheels or bearings for either lubrication or maintenance attention. As wheel drag in landing is done away with, tire wear is materially reduced.

When the loads are all *radial,* all *thrust, or a combination of both*—any of which conditions may be encountered on every landing field—they are efficiently handled by Timken—*the one bearing that does all things well.* "Happy Landings" takes on a new meaning with planes "Timken Bearing Equipped".



THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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Covering mechanics, servicing, designing, as well as the control and stability of a plane when in flight

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By C. H. CHATFIELD
and C. F. TAYLOR

Associate Professors in the Course in Aeronautical Engineering at the Massachusetts Institute of Technology.

HERE is a sound, clear and simple discussion of the fundamental principles, construction and capabilities of the airplane and its engine. The book strikes a mean between the simple "popular" aviation books and the highly technical works for the designing engineer.

Little mathematics has been used, and only a knowledge of elementary physics and mechanics is required. There are 209 photographs and diagrams.

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—Resistance of air to bodies in motion and airplane shapes designed to reduce this resistance
—Stability and airplane control
—the engine-basic principles and representative types
—the complete power plant
—construction of the modern airplane
—types of airplane, airplane instruments and accessories.

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Why flying field visitors cannot see a plane without rubbing noses with a whirling propellor . . . why they dash towards a moving plane . . or why they swarm about the scene of an accident, is difficult to understand. Humans do these things for the same reason that they stick a tentative finger onto a surface marked "Wet Paint."

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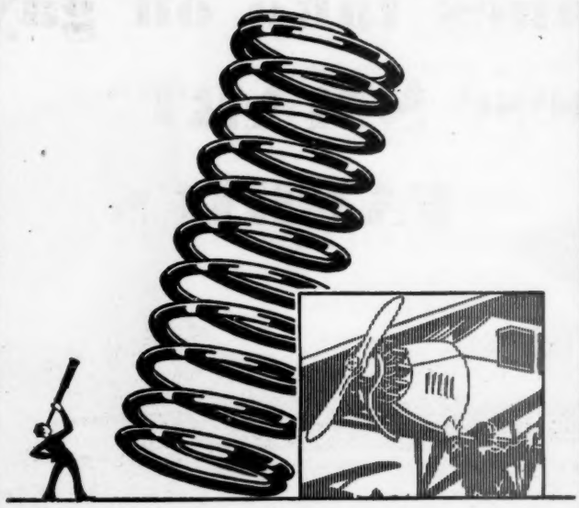

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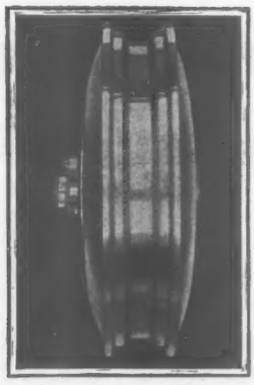

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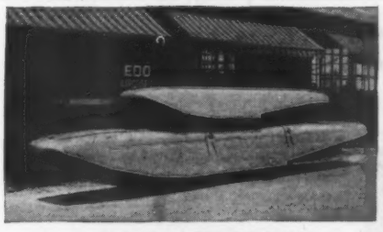

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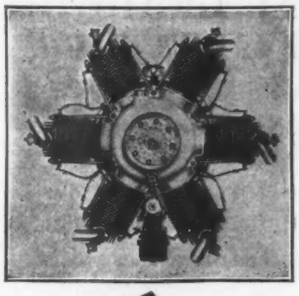

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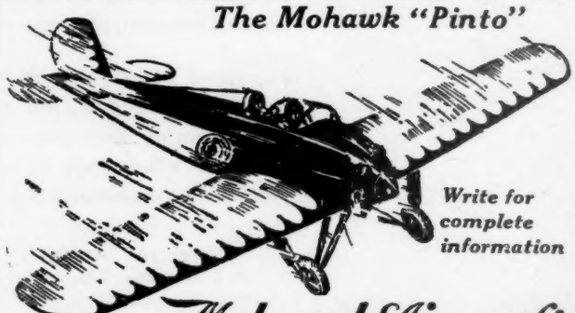

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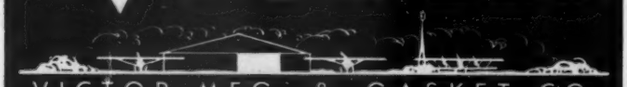

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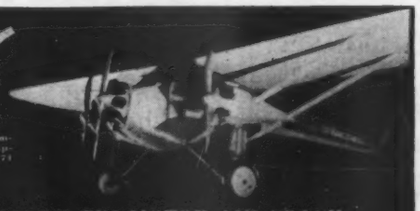

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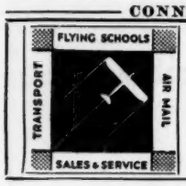

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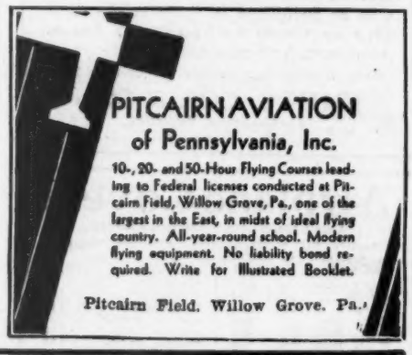

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Write or Wire
AIRCRAFT ENGINEERS INC.
Consultants for the Aircraft Industry
2012 So. Wabash Ave., Chicago, Ill.
Complete Stress Analysis
Development of New Designs

The Laboratories and the New Windtunnel of the Tubular Air-Craft Corp.

are now open for manufacturers and private individuals desiring to determine the worthiness of their patents or inventions dealing with new type of Airplanes, Helicopters, Ornithopters, etc.
Actual flying models, windtunnel and demonstration models made. Low rate.
For further information write

Tubular Air-Craft Corp. Laboratory
1125 Farm Road, Secaucus, New Jersey

C. L. OFENSTEIN
CONSULTING AERONAUTICAL ENGINEER
Formerly
Chief, Engineering Section
Aeronautics Branch, Department of Commerce
Announces the removal of offices to
TOWER BUILDING
14th and K Streets N. W. Washington, D. C.
AIRPLANE DESIGN AND STRESS ANALYSIS

SHOWALTER-ASSOCIATES
Airport Planners Architects Engineers
2210 Park Ave.
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Edward A. Stalker, 302 Eng. Bldg.
AIRPLANE DESIGN
Stress Analysis
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Ann Arbor, Michigan

AERO-KEN
Aeronautical Engineering
Complete Design and Stress Analysis
500-504 Investment Bldg.
Washington, D. C.

YOUR card here builds favorable prestige for you and helps to make your name familiar in the field. The cost is extremely small in proportion to its value as a business aid.

AIRCRAFT SERVICE DIRECTORY

See our Advertisement
On inside back cover Nov. 16th issue
PIONEER INSTRUMENT COMPANY
254 LEXINGTON AVE. BROOKLYN NEW YORK

Burgess Norton Perfectlap Piston Pins for the following makes of motors are stocked by Automotive Jobbers everywhere.

Curtiss OX-5	
Curtiss OXX-6	U.S.A.Std.
Wright, Whirlwind J4, J5	Liberty

THE BURGESS NORTON MFG. CO.,
549 Peyton St., Geneva, Ill.

STAKLAK REG. U.S. PAT. OFF. WON'T BURN OFF

Developed especially for use on airplane exhaust rings, manifolds and stacks.

Adds greatly to the appearance of any ship. Protects the surface from scale and rust.

Can be furnished in three colors, Red, Blue or Green half-pint cans 50c or Aluminum half-pint cans 75c.

Manufactured exclusively for and sold by

JOHN S. COX & SON
Aeronautical Supplies
Terre Haute, Ind.

Airplane Covers

Gov't Grade "A" Cotton Covers

Complete Set includes tacks, rib cord, magnetic hammer and rib needle.

Standard	$115	Am. Eagle	$105
Jenny	100	Monocoupe	80
Canuck	105	Swallow '27	100
Waco 9	100	Commandair	110
Waco 10	105	Curtiss Robin	85
Eagle Rock '27	100	Swallow '26	100
Eagle Rock '28	105	Curtiss Oriole	100
Travelair	100	Arrow Spt.	95

1 to 50 yds. 45c.—50 to 100 yds. 40c.—over 100, 38c.
Dope, 1 gal. $2.25, 5 gal. $1.80 gal., 30-gal. drum, $1.60 gal., 50 gal., $1.50.
Rib Cord, $1.00 Spool; Needles, 50c. each.

MONEY BACK IF NOT SATISFIED
Send 25% with Order. Liberal Discount to Dealers.
SWEEBROCK AVIATION CO.
P.O. Box 176, Ft. Wayne, Indiana

Actual Size
SEND ONE DOLLAR

We will send you by return mail a beautiful pair of sterling silver wings mounted on bar pin with safety catch, also identification card issued by National Flyers Ass'n. These pins are being worn by thousands of aviators, aviation mechanics and boosters.

Illustrated booklet describing Davenport's large Airport and school mailed with each order.

Iowa-Illinois Airways Inc.
Davenport, Iowa

GARDNER PROPELLERS

In Stock or on Short Notice
12 Years' Experience
GARDNER PROPELLER WORKS
Forest Park, Ill.

Airplane Covers

Silk thread sewed with "FLIGHTEX" AAA Fabric. Our prices below that of cheap cotton

Standard J1	$105	American Eagle	$100
Jenny	95	Commandaire	100
Canuck	100	Challanger	100
Waco 9	95	Swallow	95
Waco 10	95	Travel Air	100
Eaglerock	100	Monocoupe	75

Pinked Tape 3c. yd. Long Needle, 25c.
Dope $1.50 gal. Thinner, Ditto.
Ribcord $3 lb.

EVERYTHING FOR AIRCRAFT

OSTERGAARD
AIRCRAFT
WORKS
4305 N. Narragansett Ave., Chicago, Ill.

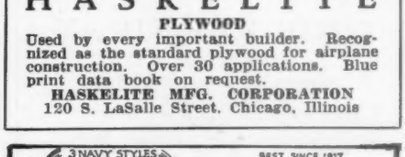
AVIATION PROTECTION, INC.
INSURANCE BROKERS TO AVIATION
110 WILLIAM STREET
NEW YORK

HASKELITE

PLYWOOD

Used by every important builder. Recognized as the standard plywood for airplane construction. Over 30 applications. Blue print data book on request.

HASKELITE MFG. CORPORATION
120 S. LaSalle Street, Chicago, Illinois



Motorize Your Hangar Doors

Allen & Drew, Inc.
Cambridge, Mass.

See our full page Adv. in Nov. 16.

Paragon Propellers

Paragon Engineers, Inc., 242 Grindal St. Baltimore, Md.

Phoenix Clear Nitrate Dope

$1.35 in 50 gal. wood barrels.
$1.37 in 30 gal. wood barrels.
$1.55 in 5 gal. boxed cans.

Immediate shipments F. O. B. factory. All fresh made from new and high grade materials.

PHOENIX AIRCRAFT PRODUCTS CO.
Williamsville, N. Y.

TRIUMPH

MAGNETIC
FUEL GAGES FOR AIRCRAFT
NEW MODELS FOR COWL, WING, OR SPECIAL TANKS
Manufactured by
The Boston Auto Gage Company
PITTSFIELD, MASSACHUSETTS

PITCH & BANK INDICATOR

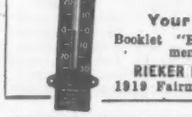
Your Position at a glance

Booklet "RIEKER Navigating Instruments" sent on request.

RIEKER INSTRUMENT COMPANY
1919 Fairmount Ave., Philadelphia, Pa.

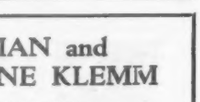
STEARMAN and AEROMARINE KLEMM

GEO. A. WIES, INC.
Hangar and Office, Roosevelt Field — Garden City, New York



PITCH INDICATOR
Adjustable Zero
Readable at a Glance.
Booklet on Request
Frisbie Aircraft Products
Box 389, New Haven, Conn

HANGARS



All-steel, fireproof.
See models at our Jamaica Sea Airport
Let us quote. Send for folder.

ADVANCED AIRCRAFT CORPORATION
135-08 Jerome Ave., Richmond Hill, N. Y.

Consult the Professional Service Directory on Page 29

SEARCHLIGHT SECTION

EMPLOYMENT and BUSINESS OPPORTUNITIES—USED and SURPLUS NEW EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, Positions Vacant, and all other classifications, excepting equipment, 10 cents a word, minimum $2.50 an insertion; 15 cents a word if a box number address care of any of our offices is used.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers may be in care of our New York, Chicago or San Francisco offices.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$6.00 an inch
4 to 7 inches..... 5.75 an inch
8 to 14 inches..... 5.50 an inch

Other spaces and contract rates on request. An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

FOR SALE

AIRPLANE motors: Hispano-Suiza A, 150 hp.; Hispano-Suiza E, 180 hp.; Siemans-Halske and Curtiss OX-5 motors, all in excellent condition. OX-5s at especially attractive prices. Write American Eagle Aircraft Corporation, Purchasing Agent, Fairfax Airport, Kansas City, Kansas.

AMERICAN Eagle, 1928, 120 hp. motor, flown 200 hours, always kept in hangar; airspeed, compass, 2 Scintilla magnetos, clock, bank indicator, duals, special landing gear and many other extras. Will sacrifice for $1,500 cash. Ralph Daugler, 441 Willoughby Ave., Brooklyn, N. Y.

AMERICAN Eagle, 1928, single aileron biplane. OXX-6 motor, guaranteed excellent condition throughout; also one newly overhauled guaranteed OXX-6 motor. Very favorable price to cash buyers. Edgar Tobin Aerial Surveys, 1515 Main Avenue, San Antonio, Texas.

BRAND new Arrow Sport LeBlond motor; just as it was received from the factory, in perfect condition, has never been flown; $2,400 for immediate sale. Hugh Rockwell, Freeport, Long Island. Telephone 4853.

DON'T read this ad unless you are looking for a real buy. OX-5 Waco ten, licensed, flown 110 hours. Test flight only since top overhaul. Always housed in dry hangar. Is in A-1 condition. Reason for selling, getting cabin ship. A sacrifice at $2,375. Write Stewart Murphy, 137 Sixth St., Scotia, N. Y.

DUAL American Eagle 1927 biplane, single aileron, completely overhauled, new fabric, completely overhauled OXX6 motor, 100 hours total time, two new type Bosch mags, $2,000 cash. Edgar Tobin Aerial Surveys, 1515 Main Avenue, San Antonio, Texas.

FIVE Model E Hisso motors, $2,000 for the lot, ready to install in planes. New Orleans Air Line, New Orleans, La.

FOR SALE—Government overhauled OX-5 motor with Miller valve action; $400 cash gets this bargain. Sky Roamers, Inc., Racine, Wis.

FOR SALE—One complete set of wings for Driggs Dart II. Never been used. Extra upper right wing panel set of ailerons, good condition, will sell the lot for $125. Tred Avon Flying Service, Inc., Easton, Md.

FOR SALE

FOR SALE—Eaglerock J-5 motormount and cowling all complete; make offer. FS-310, Aviation, 10th Ave. at 36th St., New York.

FOR SALE—Comet 7 cylinder, 150 h.p. engine, 60 flying hours, has been completely overhauled. In excellent condition, $1,300 for quick sale. Write Pittsburgh Metal Airplane Co., 1625 Island Avenue, N.S., Pittsburgh, Pa.

FOR SALE: 3-place J 6-300 Travel Air. Delivered June. Total time, 78 hours. Under licensed mechanic's care at all times. C. H. Pettersen, L. I. Aviation Country Club, Hicksville, L. I., N. Y.

FOR SALE: OX-5, run less than 15 hours, same as new, complete Berling magneto, carburetor, stacks, hub. $450. Charles Snyder, Lockport, Illinois.

NO SLUMP
in
OCTOBER

My sales were 300% greater than during the same month last year.

THERE MUST BE
REASONS

See Searchlight Section, October 26th and November 2nd for some of them.

KARL ORT, York, Pa.

FOR SALE

FOR SALE—My Whirlwind Waco, new September 14, 1929, fully equipped for night flying. Special nickel chromed struts and exhaust stacks. Standard steel propeller. New Trypod Type undercarriage with Bendix heel brakes. This ship must be seen to be appreciated and is priced to sell. E. A. Forner, Jackson, Michigan.

FOR SALE—Hisso E Eaglerock special color combination; practically new. Make offer. FS-336, Aviation, Tenth Ave. at 36th St., New York.

FOR SALE—New 1929 American Eagle 3-place biplane with spare motor. Plane was shipped to New York by freight, rigged and test hopped and is ready for delivery. Will sacrifice for $1,800. C. Robinson, 20 Horton Avenue, New Rochelle, N. Y.

FOR SALE or trade. J.N.4H. Licensed, steel landing gear, new production prop. Always kept in hangar. Ready to fly anyplace. $900. Jack Frenzl, 215 N. Morrison St., Appleton, Wis.

FOR SALE—One JN4, $440. Henry Waldheim, 187 Midland Ave., Arlington, N. J.

FOR SALE—OX5 motor, perfect condition, had 140 hrs. 18 since complete overhaul. Miller valve action. No reasonable offer refused. Make an offer. Ernest Le Clere, Coggon, Iowa.

FOR SALE: OX-5 Waco 10, with Miller valve action, and oversize wheels. Less than a year old. Plane at Brainard Field, Hartford, Conn. Apply Fred O. Weisher, Bloomfield, Conn.

FOR SALE—General Aircraft Co. Aristocrat, brand new, flown from factory only. Will sell at great discount and accept OX5 job in trade. Elmer Van Sickle, Municipal Airport, Lansing, Michigan.

FOR SALE—Slightly used Waco 10-OX5. Motor has 15 hours, turns 1,475 on ground, has dual controls, reinforced upper wings, double center section tanks, compass, airspeed, D.H. wheels, baggage compartment and a beautiful paint job. Need cash to pay mortgage on house. Will include 50 hr. flying instruction. Price $2,400. Wire William Hilburg, Bellevue Hospital, Information Bureau, New York City.

(Continued on page 34)

FOR SALE

3 CURTISS SEGAL BOATS

Passed Gov't inspection.

B. KLEIN
60 B'way, Astoria, L. I., N. Y.
Astoria 1096

FOR SALE

J-5 New Standard

Used two months. Special equipment and paint job. Ideal for barnstorming, cross country or blind flying. 90 gal. tanks. Four passengers and pilot. Heywood starter, brakes, covers, tools. Dual controls.

ARTHUR MENKEN
34 W. 52nd St., New York City

New and Used J-5
Wright Engines

No. 7763—has 25 hours since Wright factory overhaul
Price $2250.00

No. 8464—has 130 hours total. Recently factory overhauled.
Price $2750.

No. 9082—practically new. Used only 10 hours.
Price $3,000

No. 8479—absolutely new. Never unpacked.
Price $3000

These engines are all in A-1 shape but are no longer used in our current production. These motors subject to prior sale. Write or wire.

Buhl Aircraft Company
Marysville, Michigan

EXCEPTIONAL
OPPORTUNITY

1—Curtiss Robin, OX5 Motor, 95 Hours.....$2800.00
Licensed Ship in First Class Condition
1—Good OX5 Motor..... 250.00
1—New OX5 Motor..... 400.00
2—H. S. L6 Liberty Motors... 150.00
Various Tools, Instruments, Magnetos, etc. 25.00

F.S.-325, Aviation
520 N. Michigan Ave., Chicago

PLANES LISTED FOR SALE

Plane	Motor Type	Price
Robins	OX-5	$2400
Robins	OX-5	2300
Robins	OX-5	2225
Robins	OX-5	3650
Commandaire	Warner	5400
Commandaire	OX-5	3165
Commandaire	OX-5	3340
Travel-Air	OX-5	1300
Fairchild	J-5	4900
Fairchild	Ch.	5800
Cessna	Warner	6075
Cessna	Warner	6300
Cessna	Warner	6970

CURTISS FLYING SERVICE
Valley Stream Airport
Valley Stream, Long Island, N. Y.

For *Quick Sale*..

checked as air-worthy by Curtiss-Wright...

Study these 70 exceptional values in *used planes*—built by leading manufacturers... all in flying condition.

★

THE Curtiss-Wright Flying Service wants to move this equipment rapidly. These planes and engines, priced so low, will attract the buyers who recognize unusual values at such an unusual sale.

The Curtiss-Wright used plane policy, *carefully and clearly stated* on this page, sets the stamp of *positive reliability* on every plane and engine listed in this extraordinary sale. The definite specifications of past performance and present condition determine for you *precisely* the equipment you finally purchase. Every machine carries an inspection certificate.

And you can purchase any plane on this list on easy payment terms.

Many of the machines are located at Curtiss-Wright bases near to you. There you may inspect these real buys, and make your *fly-away* purchase.

For complete information, wire or write at once to the Curtiss-Wright branch shown in the last column, or to Dept. 3, 27 West 57th Street, New York City. Your message will receive immediate attention.

STATEMENT OF POLICY ON SALE OF USED PLANES

CURTISS-WRIGHT signally recognizes that the sound development of aviation depends on the insurance of *safety* in the air.

Safety is the keynote of the Curtiss-Wright policy in building its diversified range of planes and engines, and in its aerodynamic researches.

This *safety* policy, Curtiss-Wright realizes, must also be rigidly applied to the rapidly growing sales of *used* planes.

Therefore—

1. Curtiss-Wright accepts in trade only *licensed* aircraft and engines.
2. Curtiss-Wright sells used equipment only when it is *air-worthy*.
3. Curtiss-Wright examines every used plane and used engine—and gives an *accurate* and *complete* report on its condition to the prospective purchaser.
4. Curtiss-Wright issues an inspection certificate with every sale.

ANNOUNCEMENT

Curtiss Flying Service is now a part of Curtiss-Wright Corporation, the recently announced amalgamation of Curtiss and Wright interests. Henceforth, Curtiss Flying Service will operate under the name of Curtiss-Wright Flying Service—division of Curtiss-Wright Corporation.

CURTISS-WRIGHT

DIVISION OF CURTISS-

70 USED PLANES

Name of Plane	Type	Open or Cabin	No. of Pass.	Plane No.	Type of Engine	Plane and Engine Time	Price	Location
Cessna	Mono.	Cabin	3 & Pilot	8783	Warner	New	$4,750.	Buffalo
"	"	"	" " "	8794	"	16	4,670.	"
"	"	"	" " "	8144	"	10	4,700.	Detroit
"	"	"	" " "	9857	"	15	4,675.	Garden City
"	"	"	" " "	8797	"	New	4,750.	" "
"	"	"	" " "	8787	"	23	4,650.	San Francisco
"	"	"	" " "	NC-9094	"	44	4,550.	Valley Stream
"	"	"	" " "	9095	"	94	4,280.	Boston
"	"	"	" " "	C-8141	"	14	4,675.	Indianapolis
"	"	"	" " "	8150	"	57	4,515.	Louisville
"	"	"	" " "	C-9858	"	21	4,650.	Memphis
"	"	"	" " "	C-9866	"	6	4,720.	Denver
"	"	"	" " "	C-8145	"	17	4,670.	Raleigh
"	"	"	" " "	C-9856	"	24	4,630.	Pittsburgh
"	"	"	" " "	9851	"	18	4,650.	Houston
"	"	"	" " "	C-9859	"	7	4,715.	Cleveland
"	"	"	" " "	C-8793	"	New	4,750.	Miami
"	"	"	" " "	8784	"	30	4,600.	Los Angeles
"	"	"	" " "	C-8795	"	30	4,600.	Chicago
"	"	"	" " "		Wright J-6-300	5	9,200.	Baltimore
"	"	"	" " "		" " "	6	9,200.	"
"	"	"	" " "		" " 220	9	8,000.	Garden City
"	"	"	" " "		" " "	5	8,000.	" "
"	"	"	" " "		" " "	5	8,000.	Chicago
Ireland	Amphib.	Open	4 & Pilot	NC-111-H	Wright J-6	Demo.	16,800.	Garden City
"	"	"	" " "	NC-88-K	" "	"	16,800.	Detroit
Curtiss Robin	Mono.	Cabin	2 & Pilot	NC-901-K	Curtiss OX-5	30	3,050.	Buffalo
" "	"	"	" " "	NC-950-K	" "	31	3,045.	Columbus
" "	"	"	" " "	319-E	" "	40	3,000.	Indianapolis
" "	"	"	" " "	NC-949-K	" "	50	2,900.	"
" "	"	"	" " "	NC-904-K	" "	42	2,990.	Kansas City
" "	"	"	" " "	106-E	" "	29	3,045.	Philadelphia
" "	"	"	" " "	C-8398	" "	34	3,030.	Pittsburgh
" "	"	"	" " "	NC-948-K	" "		3,200.	San Francisco
" "	"	"	" " "	NC-946-K	" "	33	3,035.	Toledo
" "	"	"	" " "	108-E	" "		3,000.	Garden City
" "	"	"	" " "	C-9202	" "		3,200.	" "
Waco	Bi.	Open	3 & Pilot	C-921	OX5		1,800.	Memphis
"	"	"	" " "	NC-9513	Ryan Siemans		3,000.	Boston
"	"	"	" " "	C-9506	OX5		1,750.	Louisville
Fairchild	Mono.	Cabin	5 & Pilot	NC-3569	J5	206	3,500.	Valley Stream
"	"	"	" " "	NC-4755	J5	108	3,800.	" "
"	"	"	" " "	NC-4756	C6	62	3,900.	" "
"	"	"	" " "	NC-3637	J5		4,000.	" "
"	"	"	" " "	NC-4878	J5		3,900.	Columbus
"	"	"	" " "	NC-5985	J5		4,000.	Baltimore
"	"	"	" " "	NC-32	Challenger		3,900.	Bridgeport
"	"	"	" " "	NC-4440	J5		4,000.	Memphis
"	"	"	" " "	NC-3315	J5		4,000.	Boston
"	"	"	" " "	NC-5458	J5		4,000.	"
Travel Air	Bi.	Open	5 & Pilot	NC-6015	OX5	100	1,700.	"
" "	"	"	" " "	NC-6076	OXX6		2,000.	"
" "	"	"	" " "	NC-6012	OXX6		2,000.	Hartford
" "	"	"	" " "	NC-4851	OX5		1,750.	Moline
" "	"	"	" " "	C-6295	OX5	113	1,600.	Bridgeport
" "	"	"	" " "	NC-5392	OX5		1,600.	"
" "	"	"	" " "	C-9029	OX5	363	1,350.	Miami
" "	"	"	" " "	C-9030	OX5	403	1,250.	Valley Stream
" "	"	"	" " "	C-8867	Hisso		2,600.	Louisville
" "	"	"	" " "	C-6149	"		2,500.	Baltimore
" "	Mono.	Cabin	6 & Pilot	NC-6470	J5		7,800.	Moline
Monocoupe	"	"	2 & Pilot	5725	Velie M5		1,400.	Louisville
American Eagle	Bi.	Open	3 & Pilot	C-271-E	OXX6	90	1,650.	Oklahoma City
" "	"	"	" " "	C-545-E	Kinner	36	3,200.	" "
" "	"	"	" " "	C-5992	Hisso	146	2,200.	Chicago
" "	"	"	" " "	C-7762	OX5		1,500.	Houston
Stinson	Bi.	Cabin	3 & Pilot	NC-2779	Less engine		1,500.	Boston
"	"	"	" " "	NC-3795	" "		1,500.	"
Sparton	"	Open	3 & Pilot	NC-6577	Siemans Halske		1,750.	Detroit
Ireland	"	"	5 & Pilot	NC-4667	J5		12,000.	New York City

FLYING SERVICE

WRIGHT CORP. ***"World's Oldest Flying Organization"***

FOR SALE

(Continued from page 31)

FOR SALE: Waco 10 OX-5, licensed. Excellent condition. Wings and fuselage completely re-covered. Motor just overhauled. Like new. Duals and full set instruments. Flown by transport pilot. Always kept in hangar. Bargain $1,800. E. Monroe Osborne, East Hampton, N. Y.

HISSO 180 hp. Wright E motor, perfect condition, just completely overhauled; will trade for an OXX-6 preferably or an OX-5 motor; must also be in perfect condition. "Skywriters," Roosevelt Field, Long Island, N. Y.

HISSO A, 150 hp. Excellent condition. 30 hours since overhaul. Nearly new propeller and nose radiator. Will sell all at sacrifice. Make an offer. P. C. Collins, 119 N. 7th St., St. Louis, Mo.

MODERN all-metal flying boat with completely rebuilt M. F. wings and tail surfaces, licensed September 12th by the Dept. of Commerce, N. C. 124, powered with good 180 hp. Hispano with salt cooled valves, Delco ignition, new 12 volt battery, Bijour electric starter, dash primer, etc. The boat was copied from Curtiss Sea Gull with more beam and higher bow, but is all dural in both hull and sidewalks. Curtiss Reed metal propeller. An exceptionally strong job and does not leak a drop. Extra wing tip pontoons. Larger spars were used in rebuilding wings, and wings were inspected by the Dept. of Commerce before covering. Never cracked up and in perfect condition. Has 75 gallon aluminum gas tank, two strainers on line, all instruments including clock, tachometer, gages, etc. Cigar lighter on dash, night flying lights, seats four, including pilot. Dual control with special wheels, one set of controls can be disconnected. Marshall spring front seats, life preservers, lockers, anchor, lines, etc. An excellent ship for the coast or Mississippi River for this winter. A splendid ship in a sea. Assembled and ready to fly away now. Price $4,500. Write or wire for pictures. Paul Strasburg, corner of Jefferson and Newport Avenues, Detroit, Mich.

BETTER BUYS IN BETTER USED AIRPLANES

If you want a ship; and if you want the best the market affords for the money you have to invest,—if you want a safe, good flying guaranteed and Government Licensed craft; ask for your "Requirement Data" blank.

Ship Owners: If yours is for sale, we have the buyer. Ask for our Listing Blank.

Wire or Write

Wichita Airplane Brokerage Co.
Wichita, Kansas

FOR SALE

Flottorp Approved OX5 Propellers With Spinners

12—Brand new $80, for Travel Air, Waco, Swallow, Eaglerock, Curtiss Robin, Bird Wing, Challenger, and American Eagle, price $45 C.O.D. Wire or write.

HOUSEMAN
524 Northwood St., Grand Rapids, Mich.

BARGAIN

Imported DeHaviland Moth

Cost new $5,900. Privately owned. Approximately 50 hours. Ship and motor guaranteed like new.

FS-328, Aviation
Tenth Ave. at 36th St., New York City

EMERGENCY

Ryan B-5 J-6 300

Less than 50 hours; one of our customers lost heavily on stock market and will take any reasonable quick cash offer. Ship perfect condition, just like new.

SAM GATES, INC.
Louisville, Ky.

FOR SALE

FOR SALE—Warner Challenger, 150 hours. Just been entirely overhauled, including engine. Complete with compass, air speed indicator, brakes, steel prop., etc. Sacrifice. Make offer. Comet Challenger with Haywood starter. Exceptional condition. Bargain $2,950. J6 Fleet, brand new, beautiful job. Complete with all instruments, accessories, etc. Chance to save $2,000 on list price. Westchester Airport Corporation, Armonk, N. Y. Telephone Armonk Village 308. 122 East 42nd Street. Telephone Caledonia, 6188.

FOR SALE—Used ships—time or cash. 2 OX5 Center Section Eaglerocks, 2 Avro Avian Cirrus motored planes, 1 Challenger Eaglerock, equipped for night flying. 1 Cardinal 2 place cabin LeBlond Sixty. All above latest models. 1 Ryan B-1 5-place cabin-J5 Job. All ships A-1 condition and licensed. Write or wire Von Hoffmann Aircraft Co., St. Louis, Mo.

NEW high compression Liberty heavy gears, tools, $300. Hisso A $400. Hisso E with new Hamilton prop. $550. OXX cylinders $10. K-6 new valves and bearings just overhauled $400. Small seaplane floats new $100 each. Vought floats $200. New government tanks of all kinds cheap. Licensed C6 Seagull steel prop. like new, $3,000. Waco ten seaplane, $2,000. Boeing flying boat Wasp motor, 130 miles, used 100 hrs. licensed, inclosed, five place, sacrifice for cash. Inertia starter for any type motor, hand starters for Hisso and OX, parts for OX2-OXX3. Liberty six complete $250 props. of all types, set of new Fairchild floats with beaching gear used 1 day. F. Mills, Essington, Pa.

ONE new Eaglerock with edo pontoons and landing gear with OXX-6 motor for $2,250. New Orleans Air Line, New Orleans, La.

ONE new Cessna A. W. Warner cabin monoplane, has been used thirty hours. Owner must sell on account of not obtaining pilot's license. Price $5,000. Can be seen at Palwaukee Airport, Mount Prospect, Ill. Address L. Bjourndahl, in care of Palwaukee Airport.

ONE Standard J. I. 180 Hisso in excellent flying condition. Re-covered this summer. Bargain. Can arrange terms for part or will take new car as part pay. Box 215, Macon, Mo.

P & W engines, three, Wasp series B, factory reconditioned, good value. FS-338, Aviation, Tenth Ave. at 36th St., New York.

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PARACHUTES, new and used, rope ladders for stunt men, etc. Specify weight. Thompson Bros. Balloon and Parachute Co., Aurora, Illinois. Established 1903.

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CASH for best four-place dual control cabin ship ready for immediate delivery. Dawson-Babcock Aircraft Corp., 1001 Law & Finance Bldg., Pittsburgh, Pa.

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WANTED—Licensed ship, prefer 3 place open radial. 65 W. Maple St., Chicago, Room 1.

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WILL trade brand new Special Hudson Sedan with Radio installed and ($300) accessories for late production Ship. Wire J. Kappes, Bismarck, No. Dak.

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CURTISS graduate, 18, 53 hours solo: will fly anywhere, anytime; unlicensed. William Sinclair, Montpelier, Ind.

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G-19

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Owing to Thanksgiving Day, Nov. 28th, the *"Searchlight"* pages of the Nov. 30th issue of

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will close one day in advance of the regular schedule.

Advertisers will be cooperating with us by sending new advertisements or changes of copy early.

FINAL CLOSING TIME
5 P.M. Friday,
November 22nd.

POSITIONS WANTED

TRANSPORT pilot, college educated, married, desires affiliation with firm as pilot, or executive, operating anywhere. PW-341, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot, age 25. Sales experience. PW-337, Aviation, Tenth Ave. at 36th St., New York.

YOUNG man, 35 years old, wants position in aviation field. Have had 12 years' experience as automobile mechanic, but will do anything to help get mechanic's license. Kenneth Bristol, Belchertown, Mass.

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SPECIAL prices on graphite and plain valve guises and seats for November and December only. 8 exhaust guides and 8 exhaust valve seats installed, $14. OX-5 and OXX-6 cylinders, $10. Bosch breaker plates to replace Berling, $7. Berling contacts per set, $4. Hartzell propellers fit Waco 10, $40. Illinois Flying Company, 4 West Fourth Street, Sterling, Illinois.

REBUILD your OX5 with removable graphite guides, inserted seats and oversize valve action pins. OX5 and Hisso parts. Write for circular. Heckman Machine Works, 4026 West Lake Street, Chicago, Illinois.

A FEW Dixie 800 magnetos, overhauled, like new and guaranteed, $30. Will allow $10 credit for your old magneto. We repair altimeters, tachometers, magnetos, etc. Streed Elec. Co., 1312 Harmon Pl., Minneapolis, Minn.

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Included in the sale price is all the present flying equipment, buildings and real estate, which possess unusual merit on account of their unexcelled location for non-competitive local operation and inter-city terminal facilities. Real estate alone will appraise for well over $100,000. A remarkable opportunity for the operation and manufacture of flying boats and amphibians. Local passenger flights alone will yield $50,000 per year. Business established and in constant operation for thirteen years.

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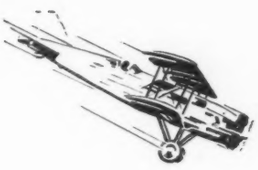

Port	Line	Fare	SCHEDULE Lv.	SCHEDULE Ar.	RETURN Lv.	RETURN Ar.	Air Miles	Plane	Seats	Motor
ABILENE, TEXAS	Central-Braniff	o.w. $ 65 00 r.t. 126 00	9 00 (S.D.S.) At Wichita 6 hrs. 3 10	12 10 Ov't. Okla. City	8 50 Via Tulsa or Ov't. Okla. City	6 30 11 30	387 via O. C. 475 via Tulsa	Travel Air and Fokker F-10-A	6 6 12	Wasp 425 H. P. 3 Wasps 1275 H. P.
ALBUQUERQUE, N. MEX.	Western Air Express	o.w. $ 95 00 r.t. 190 00	8 30 C.T.	5 00 M.T.	12 05 M.T.	9 30 C.T.		Fokker F-10-A	12	3 Wasps 1275 H. P.
AMARILLO, TEXAS	Western Air Express	o.w. $ 60 00 r.t. 120 00	5 30 C.T.	3 40 C.T.	4 30 C.T.	2 50 C.T.		*Fokker F-10-A	12	3 Wasps 1275 H. P.
BARTLESVILLE, OKLA.	Central	o.w. $ 30 00 r.t. 60 00	9 00 At Wichita 6 hrs. 3 10	(S.D.S.) 6 10	7 50 3 00	11 30 6 30	275	Travel Air	6	Wasp 425 H. P.
BRECKENRIDGE, TEXAS	Central-Braniff	o.w. $ 56 00 r.t. 112 00	9 00 At Wichita 6 hrs. 3 10	(S.D.S.) Ov't. Okla. City	7 40 Via Tulsa or Ov't. Okla. City	6 30 11 30	534 via O. C. 637 via Tulsa	Travel Air Hamilton Fairchild	6 6 6	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P.
CHICAGO, ILL.	Universal	o.w. $ 56 75 r.t. 104 50	12 55	5 55	9 45	1 50	430	Fokker F-10-A	12	3 Wasps 1275 H. P.
CLEVELAND, OHIO	Universal	o.w. $ 92 50 r.t. 175 00	12 10	7 45	8 40	1 50	740	Fokker F-10-A	12	3 Wasps 1275 H. P.

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OKLAHOMA CITY, OKLA.	Central Braniff	o.w. $ 35 00 r.t. 65 00	9 00 At Wichita 6 hrs. 3 10	(S.D.S.) 7 10	7 30	11 30	205	Travel Air	6	Wasp 425 H. P.
OMAHA, NEB.	Universal	o.w. $ 23 00 r.t. 43 00	10 15	12 05	1 10	2 00	166	Ryan Brougham Fokker Super Universal	4 6 6	Wasp 425 H. P. Wasp 425 H. P.
PEORIA, ILL.	Universal	o.w. $ 48 38 r.t. 90 75	12 20 At St. Louis 1½ hrs.	4 00	7 35 At St. Louis 2 hrs.	2 05	285	Ryan Brougham Fokker Super Universal	4 6 6	Wasp 425 H. P. Wasp 425 H. P.
PONCA CITY, OKLA.	Central	o.w. $ 33 30 r.t. 67 00	9 00 At Wichita 6 hrs. 3 10	(S.D.S.) 6 00	8 30	11 30	200	Travel Air	6	Wasp 425 H. P.
ST. LOUIS, MO.	Universal	o.w. $ 32 00 r.t. 60 00	12 20 2 10	2 40 5 00	7 35 11 15	10 05 1 45	235	Ryan Brougham Fokker Super Universal	4 6 6	Wasp 425 H. P.
ST. PAUL, MINN.	Yellow Cab Airways	o.w. $ 33 00 r.t. 66 00	9 00	3 30	9 00	5 30		Fairchild	6	Wasp 425 H. P.
SAN ANGELO, TEXAS	Central-Braniff	o.w. $ 72 50 r.t. 145 00	9 00 At Wichita 6 hrs. 3 10 Ov't. Okla. City or Tulsa	(S.D.S.) 3 30	8 30 Via Tulsa or Ov't. Okla. City	6 30 11 30	660	Travel Air Hamilton Fairchild Fokker F-10-A	6 6 6 12	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P. 3 Wasps 1275 H. P.
SALINA, KAS.	U. S. Airways	o.w. $ 14 00 r.t. 28 40	9 00	10 25	2 45	4 10	155	Fleetwings	7	Wasp 425 H. P.
SEMINOLE, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o.w. $ 41 00 r.t. 80 00	9 00 At Wichita 6 hrs. 3 10 Ov't Okla City 2 hrs. or Tulsa	(S.D.S.) 5 30	8 40 Via Tulsa (S.D.S.)	6 30	360 via O. C. 397 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	6 6 6 12	Wasp 425 H. P. Wasp 425 H. P. 3 Wasps 1275 H. P.
SPRINGFIELD, ILL.	Universal	o.w. $ 40 75 r.t. 79 25	12 20 At St. Louis 1¼ hrs.	5 10	8 15 At St. Louis 2 hrs.	2 45	496	Ryan Brougham Fokker Super Universal	4 6 6	Wasp 425 H. P.
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SWEETWATER, TEXAS	S.A.F.E. WAY	o.w. $ 60 00 r.t. 120 00	9 30	6 40	8 15	2 10		Ford All-Metal	14	3 Wasps 1275 H. P.
TOPEKA, KAS.	U. S. Airways	o.w. $ 7 00 r.t. 14 00	8 00	9 40	5 00	6 30	50	Travel Air	6	Wasp 425 H. P.
TULSA, OKLA.	S.A.F.E. WAY	o.w. $ 22 00 r.t. 44 00	9 30	12 05	12 00	2 00		Ford All-Metal	14	3 Wasps 1275 H. P.
TULSA, OKLA.	Central	o.w. $ 30 00 r.t. 60 00	9 00 At Wichita 6 hrs. 3 10	(S.D.S.) 6 40	7 30 2 00	11 30 6 30	205	Travel Air	6	Wasp 425 H. P.
WAYNOKA, OKLA.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	2 55	6 35	8 55	11 45		Ford All-Metal	10	3 Wasps 1275 H. P.
WEWOKA, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o.w. $ 40 00 r.t. 80 00	9 00 At Wichita 6 hrs. 3 10 Ov't. Okla. City or Tulsa	(S.D.S.) 5 00	8 00 At Tulsa 8½ hrs.	6 30 2 00	367 via O. C. 500 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	6 6 6 12	Wasp 425 H. P. Wasp 425 H. P. Wasp 425 H. P. 3 Wasps 1275 H. P.
WICHITA, KAS.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	2 55	6 35	10 10	11 45	175	Ford All-Metal	10	3 Wasps 1275 H. P.
WICHITA, KAS.	Western Air Express	o.w. $ 25 00 r.t. 50 00	6 30	10 30	6 30	8 10	175	Fokker F-10-A	12	3 Wasps 1275 H. P.
WICHITA, KAS.	Central	o.w. $ 17 50 r.t. 35 00	9 00 5 30	11 00 1 00	9 30 6 30	11 30 1 30	175	Travel Air	6	Wasp 425 H. P.
WICHITA FALLS, TEXAS Via Wichita and Okla. City (S.D.S. Universal)	S.A.F.E. WAY	o.w. $ 45 00 r.t. 90 00	9 30	5 10	9 45	2 30		Ford All Metal	14	3 Wasps 425 H. P.

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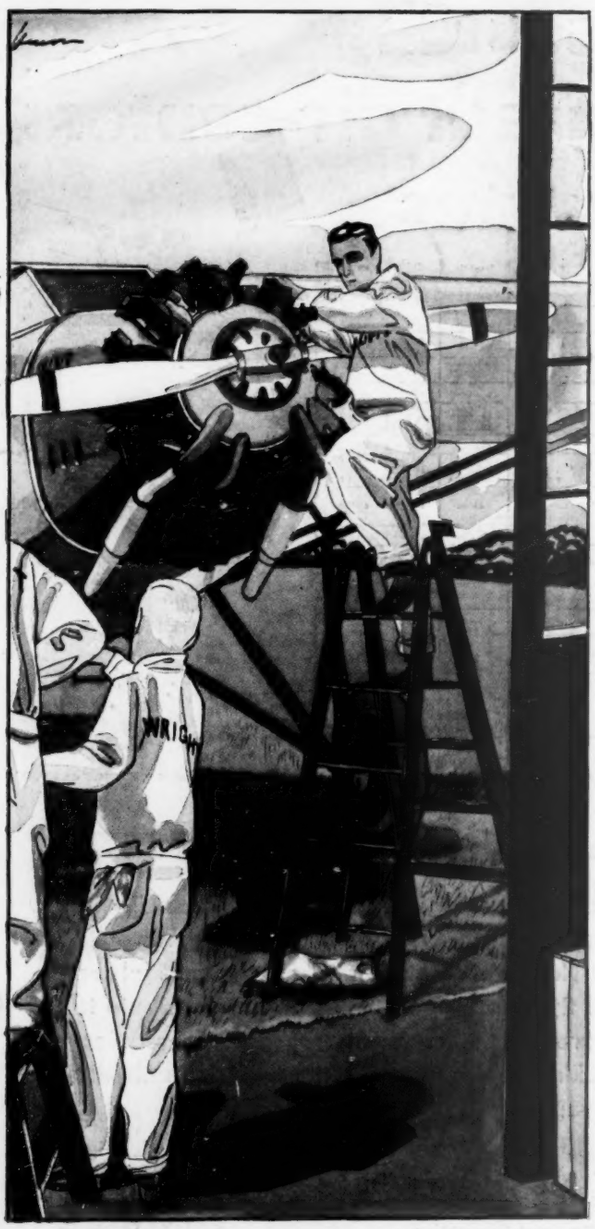

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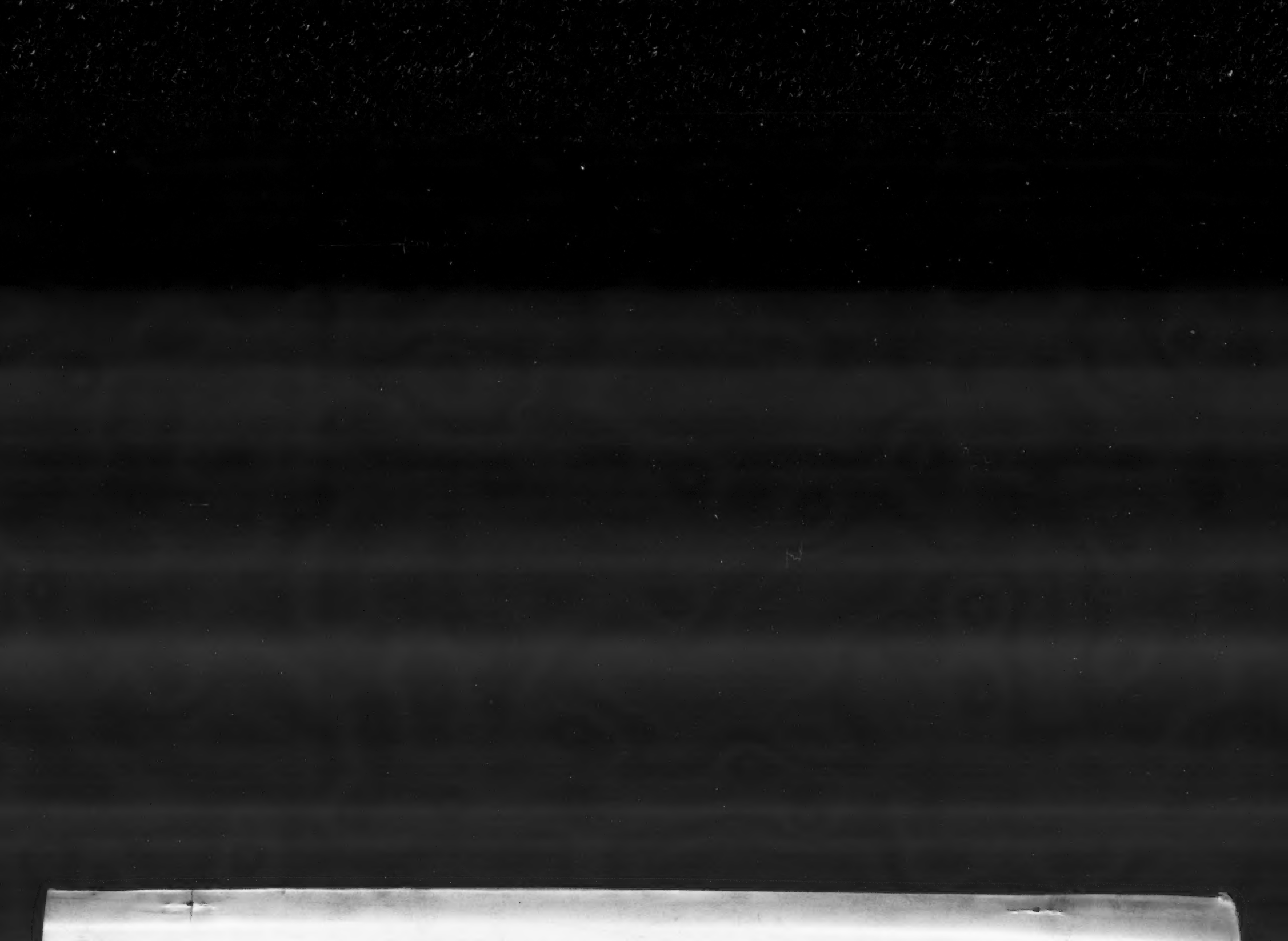
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